

**The Southeast Alaska Northern Southeast Inside  
Sablefish Fishery Information Report With Outlook to  
the 2009 Fishery**

by

**Kamala Carroll,**

**Allison Sayer,**

**and**

**Cleo Brylinsky**

---

December 2009

---

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



## Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)		General		Measures (fisheries)	
centimeter	cm	Alaska Administrative		fork length	FL
deciliter	dL	Code	AAC	mideye-to-fork	MEF
gram	g	all commonly accepted		mideye-to-tail-fork	METF
hectare	ha	abbreviations	e.g., Mr., Mrs., AM, PM, etc.	standard length	SL
kilogram	kg			total length	TL
kilometer	km	all commonly accepted			
liter	L	professional titles	e.g., Dr., Ph.D., R.N., etc.	<b>Mathematics, statistics</b>	
meter	m			<i>all standard mathematical</i>	
milliliter	mL	at	@	<i>signs, symbols and</i>	
millimeter	mm	compass directions:		<i>abbreviations</i>	
		east	E	alternate hypothesis	H <sub>A</sub>
<b>Weights and measures (English)</b>		north	N	base of natural logarithm	<i>e</i>
cubic feet per second	ft³/s	south	S	catch per unit effort	CPUE
foot	ft	west	W	coefficient of variation	CV
gallon	gal	copyright	©	common test statistics	(F, t, $\chi^2$ , etc.)
inch	in	corporate suffixes:		confidence interval	CI
mile	mi	Company	Co.	correlation coefficient	
nautical mile	nmi	Corporation	Corp.	(multiple)	R
ounce	oz	Incorporated	Inc.	correlation coefficient	
pound	lb	Limited	Ltd.	(simple)	r
quart	qt	District of Columbia	D.C.	covariance	cov
yard	yd	et alii (and others)	et al.	degree (angular )	°
		et cetera (and so forth)	etc.	degrees of freedom	df
<b>Time and temperature</b>		exempli gratia		expected value	<i>E</i>
day	d	(for example)	e.g.	greater than	>
degrees Celsius	°C	Federal Information		greater than or equal to	≥
degrees Fahrenheit	°F	Code	FIC	harvest per unit effort	HPUE
degrees kelvin	K	id est (that is)	i.e.	less than	<
hour	h	latitude or longitude	lat. or long.	less than or equal to	≤
minute	min	monetary symbols		logarithm (natural)	ln
second	s	(U.S.)	\$, ¢	logarithm (base 10)	log
		months (tables and		logarithm (specify base)	log <sub>2</sub> , etc.
<b>Physics and chemistry</b>		figures): first three		minute (angular)	'
all atomic symbols		letters	Jan,...,Dec	not significant	NS
alternating current	AC	registered trademark	®	null hypothesis	H <sub>0</sub>
ampere	A	trademark	™	percent	%
calorie	cal	United States		probability	P
direct current	DC	(adjective)	U.S.	probability of a type I error	
hertz	Hz	United States of		(rejection of the null	
horsepower	hp	America (noun)	USA	hypothesis when true)	$\alpha$
hydrogen ion activity	pH	U.S.C.	United States	probability of a type II error	
(negative log of)			Code	(acceptance of the null	
parts per million	ppm	U.S. state	use two-letter	hypothesis when false)	$\beta$
parts per thousand	ppt, ‰		abbreviations	second (angular)	"
			(e.g., AK, WA)	standard deviation	SD
volts	V			standard error	SE
watts	W			variance	
				population	Var
				sample	var

***FISHERY MANAGEMENT REPORT NO. 09-54***

**THE SOUTHEAST ALASKA NORTHERN SOUTHEAST INSIDE  
SABLEFISH FISHERY INFORMATION REPORT WITH OUTLOOK TO  
THE 2009 FISHERY**

By  
Kamala Carroll, Allison Sayer and Cleo Brylinsky  
Alaska Department of Fish and Game, Division of Commercial Fisheries, Sitka

Alaska Department of Fish and Game  
Division of Sport Fish, Research and Technical Services  
333 Raspberry Road, Anchorage, Alaska, 99518-1599

December 2009

This research was partially supported under NOAA grants Alaska Fisheries Information Network NA17FN2591, Interjurisdictional Fisheries Act (IJF) III NA03NMF4070165, and (IJF) III NA03NMF4070166, Nearshore Marine Research (NMR) III NA16FN1560 and (NMR) V NA03NMF4370202.

The Fishery Management Reports series was established in 1989 by the Division of Sport Fish for the publication of an overview of management activities and goals in a specific geographic area, and became a joint divisional series in 2004 with the Division of Commercial Fisheries. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports are available through the Alaska State Library and on the Internet: <http://www.sf.adfg.state.ak.us/statewide/divreports/html/intersearch.cfm>. This publication has undergone regional peer review.

*Kamala Carroll, Allison Sayer, and Cleo Brylinsky  
Alaska Department of Fish and Game, Division of Commercial Fisheries,  
304 Lake Street, Room 103, Sitka, Alaska 99835-7563, USA*

*This document should be cited as:*

*Carroll, K., A. Sayer, and C. Brylinsky. 2009. The Southeast Alaska Northern Southeast Inside sablefish fishery information report, with outlook to the 2009 fishery. Alaska Department of Fish and Game, Fishery Management Report No. 09-54, Anchorage.*

The Alaska Department of Fish and Game (ADF&G) administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The department administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act (ADA) of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972.

**If you believe you have been discriminated against in any program, activity, or facility please write:**

ADF&G ADA Coordinator, P.O. Box 115526, Juneau, AK 99811-5526  
U.S. Fish and Wildlife Service, 4401 N. Fairfax Drive, MS 2042, Arlington, VA 22203  
Office of Equal Opportunity, U.S. Department of the Interior, 1849 C Street NW MS 5230, Washington DC 20240

**The department's ADA Coordinator can be reached via phone at the following numbers:**

(VOICE) 907-465-6077, (Statewide Telecommunication Device for the Deaf) 1-800-478-3648,  
(Juneau TDD) 907-465-3646, or (FAX) 907-465-6078

**For information on alternative formats and questions on this publication, please contact:**

ADF&G Division of Sport Fish, Research and Technical Services, 333 Raspberry Road, Anchorage AK 99518 (907) 267-2375.

# TABLE OF CONTENTS

	<b>Page</b>
LIST OF TABLES.....	ii
LIST OF FIGURES.....	ii
LIST OF APPENDICES .....	ii
ABSTRACT .....	1
INTRODUCTION.....	1
Sablefish Life History.....	1
FISHERY HISTORY .....	3
Summary.....	3
Harvest and Regulation History, 1906–2009.....	3
Board of Fish Changes in NSEI Sablefish Commercial Fishing Regulations, 2003–2009.....	6
Participation.....	6
RESEARCH ACTIVITIES .....	7
Stock Assessment .....	7
Additional Research.....	8
2008 COMMERCIAL FISHERY.....	10
Commercial Fishery.....	10
CPUE.....	11
Biological Data .....	12
Fishery Bycatch .....	13
2009 COMMERCIAL FISHERY.....	14
Biomass Estimate.....	14
Unreported Mortality .....	14
Directed Fishery Quota.....	15
REFERENCES CITED .....	16
TABLES.....	19
FIGURES .....	23
APPENDICES .....	37

## LIST OF TABLES

Table	Page
1. Number of permits and vessels, catch, Equal Quota Share (EQS), and price in the NSEI sablefish fishery, 1969–2008.....	20
2. Summary of NSEI quota share fishery, 2000–2008. All fish quantities are in round pounds. ....	21

## LIST OF FIGURES

Figure	Page
1. Management areas for the state sablefish fisheries in Southeast Alaska, including Northern Southeast Outside (NSEO), Northern Southeast Inside (NSEI), Central Southeast Outside (CSEO), Southern Southeast Outside (SSEO), and Southern Southeast Inside (SSEI).....	24
2. Northern Southeast Inside (NSEI) sablefish reported catch and annual quota, 1906–2008, and average price per pound, 1977–2008.....	25
3. Northern Southeast Inside (NSEI) commercial sablefish fishery and Alaska Department of Fish and Game (ADF&G) Chatham Strait longline survey CPUE, 1980–2008. ....	26
4. Alaska Department of Fish and Game groundfish statistical areas in Northern Southeast Inside (NSEI). Statistical areas 345631 and 345701 are shaded.....	27
5. Northern Southeast Inside (NSEI) sablefish fishery harvest distribution by statistical area and year, from 2005 to 2008.....	28
6. Northern Southeast Inside (NSEI) sablefish fishery and survey length frequency distribution, 2008. ....	29
7. Northern Southeast Inside (NSEI) sablefish fishery and survey length frequency distributions, 2007–2004.....	30
8. Northern Southeast Inside (NSEI) sablefish fishery and survey length frequency distributions, 2003–2000.....	31
9. Northern Southeast Inside (NSEI) sablefish fishery length frequency distributions of male and female sablefish in 2008 and 2002.....	32
10. Northern Southeast Inside (NSEI) sablefish fishery age frequency distributions, 2002 to 2008.....	33
11. Northern Southeast Inside (NSEI) sablefish longline survey age frequency distributions, 1988–2008. ....	34
12. Northern Southeast Inside (NSEI) round pounds of bycatch, by species, on trips targeting sablefish, 1997–2008.....	35

## LIST OF APPENDICES

Appendix	Page
A. Chronology of NSEI sablefish fishery management action and changes in season and harvest. ....	38
B. Information on regulations for the Northern Southeast Inside Subdistrict (Chatham Strait) sablefish fishery adopted by the Board Of Fisheries in Anchorage, Alaska, March 1994. ....	41
C. ADF&G logbook page used in the NSEI sablefish fishery. ....	45
D. NSEI longline survey specifications, 1988–2009.....	46
E. Calculations used by ADF&G to standardize commercial fishery sets for hook spacing. ....	47
F. Sablefish maturity stages and criteria used by the Alaska Department of Fish and Game.....	48
G. Instructions for delivering fish out of state.....	49
H. Permits and paperwork needed to fish in the NSEI sablefish fishery.....	50
I. Listing of ADF&G Region I Commercial Fisheries Groundfish Personnel.....	51

## ABSTRACT

The purpose of this document is to provide information on the state managed Northern Southeast Inside sablefish fishery. This report is designed to be used in conjunction with the 2009–2010 Commercial Groundfish Fishing Regulations and active News Releases and Emergency Orders, as these inseason actions will supersede information provided in this document.

Keywords: Sablefish, blackcod, *Anoplopoma fimbria*, Chatham Strait, Northern Southeast Inside Subdistrict, NSEI, Fishery, Management, Outlook Regulations, Quotas, CPUE, Equal Quota Share, EQS, Alaska.

## INTRODUCTION

The sablefish (*Anoplopoma fimbria*) fishery is the oldest and most lucrative groundfish fishery managed by the State of Alaska. Sablefish, also known as blackcod, is a commercially important species throughout its range, and is typically harvested using longline or pot gear. The Alaska Department of Fish and Game Southeast Region (ADF&G, Region I) manages the sablefish fishery in the Northern Southeast Inside Subdistrict (NSEI) (Figure 1), commonly known as the Chatham sablefish fishery. ADF&G also manages a smaller sablefish fishery in the Southern Southeast Inside (SSEI) Subdistrict (Sayer and Holum 2007).

The NSEI sablefish fishery is currently a limited entry, Equal Quota Share (EQS) fishery with 88 permit holders (Table 1), and is limited to longline gear. The price of sablefish remains high, but the Annual Harvest Objective (AHO) has decreased from 4,761,905 round pounds at the beginning of the EQS system to 1,071,000 round pounds in 2009. The EQS has gone from 38,889 round pounds per permit in 1994 to 12,710 in 2009. This report summarizes the commercial longline fishery and the management of sablefish in NSEI from the early years of the fishery through the present and details the recent overall harvest, biological data, catch per unit of effort (CPUE), longline fishing patterns and fishery bycatch. Relevant Board of Fish decisions from 2003 through 2009 and recent department biological research activities are also summarized.

## SABLEFISH LIFE HISTORY

Sablefish are one of two species that make up the Anoplopomatidae family that also includes skillfish (*Erilepis zonifer*). They occur only in the North Pacific Ocean, the Bering Sea, and adjacent waters from Hokkaido, Japan to Baja California. Their greatest abundance is in the Gulf of Alaska (Wolotira et al. 1993). Sablefish are divided into two populations. The northern population extends from northern British Columbia through the Gulf of Alaska and west to Japan. The southern population extends from southern British Columbia to the Baja peninsula. These populations were divided based on differences in size at maturity, growth, and movement (McDevitt 1990). Sablefish are known to be highly migratory and commonly travel over 1000 miles from where they were born (Maloney and Sigler 2008).

Adult sablefish are demersal (Krieger 1997) and inhabit the deeper water areas of the continental shelf, slope, and deep-water coastal fjords. Most adults live at depths between 200 and 500 fm (366 m and 915 m), although they have been found at depths ranging from 100 to 1000 fm (183 m to 1,830 m) (Allen and Smith 1988). Fish generally move to deeper depths as they age (Maloney and Sigler 2008).

Adult sablefish are opportunistic feeders, preying on fishes (including pollock (*Theragra chalcogramma*), eulachon (*Thaleichthys pacificus*), capelin (*Mallotus villosus*), herring (*Clupea pallasii*), sandlance (family Ammodytidae), Pacific cod (*Gadus macrocephalus*), and flatfish,

squid, euphasids (also known as krill), Pandalid shrimps and jellyfish (Yang and Nelson 2000). Yearling sablefish feed primarily on euphasids (Sigler et al. 2001b).

Juvenile sablefish are preyed upon by adult coho and Chinook salmon (*Oncorhynchus kisutch* and *Oncorhynchus tshawytscha*). ADF&G troll logbooks from 1977 through 1984 reported young sablefish as the fourth most common species in the stomach contents of both species (Wing 1985). Pacific halibut (*Hippoglossus stenolepis*) have also been documented to eat adult sablefish although sablefish make up a minor proportion of the total halibut diet (Yang and Nelson 2000). Cod (*Gadus spp.*), lingcod (*Ophiodon elongatus*), hagfishes (class Myxini), sharks, and killer whales (*Orcinus orca*) have also been reported to eat adult sablefish (Kruse et al. 2000).

Sablefish recruitment is marked by periodic exceptional year classes interspersed with periods of relatively low recruitment. Strong cohorts are apparent when large numbers of one year old sablefish are observed distributed across many different shallow water areas. During more typical years, one and two year old sablefish are found in a few specific shallow water areas. Recruitment is thought to be strongest when periodic global weather events such as El Niño or Pacific Decadal Oscillation (PDO) phase changes lead to above average sea surface temperatures (Sigler et al. 2003).

Sablefish spawn in pelagic waters at depths of 300–500 m (164–273 fm) in the late winter and early spring, in areas near the edge of the continental slope (Sigler et al. 2001, McFarlane and Nagata 1988). One study has found that fifty percent of females are ready to spawn when they are 6.5 years old and fifty percent of males are mature at 5 years old (Sasaki 1985), but there may be regional variability in growth and maturity rates (McDevitt 1990). Eggs develop at depth and larvae develop near surface waters. Juveniles exhibit rapid growth, growing an average of 1.19 mm per day during their first spring and summer. Juvenile sablefish reside in continental shelf waters, often in bays and nearshore waters, and move deeper with age.

In the Gulf of Alaska, adult male sablefish average length is 69 cm and average weight is 3.4 kg. Adult females average 83 cm 6.2 kg (Sigler et al. 2003). Sablefish randomly sampled from 1997 through 2008 in NSEI during ADF&G surveys had a maximum length of 111 cm for females and 95 cm for males. Survey males averaged 63 cm and females averaged 69 cm.

Sablefish are relatively long lived. Fish over age 40 are commonly found in commercial fishery samples, and the average age of sablefish sampled from the most recent commercial fishery is 16. The maximum reported age for sablefish in Alaska is 94 years (Kimura et al. 1998), and for NSEI, 79 years. As sablefish are difficult to age, these ages should be considered approximate (Pearson and Shaw 2004).

The current National Marine Fisheries Service (NMFS) stock assessment for the Gulf of Alaska estimates the sablefish mortality rate at 0.10. This is in agreement with several published estimates for the Gulf of Alaska (Sigler et al. 2001, Johnson and Quinn 1988), although a higher estimate of 0.112 (Funk and Bracken 1984) has been used by federal managers in the past (Sigler et al. 2003). Hoenig's formula for estimating natural mortality yields a rate of 0.05 (5%) for NSEI sablefish (Hoenig 1983).



# FISHERY HISTORY

## SUMMARY

Although directed fishing was recorded as early as 1913, the majority of sablefish landed in the early 20<sup>th</sup> century were bycatch in the halibut fishery (Bergmann 1975). There were peaks in directed effort during both World Wars, and peaks associated with demand from the vitamin industry (Figure 2) (Bracken 1983). The 1940s brought the beginning of localized depletions and more active fishery management (Appendix A). After a period of decline in price and effort during the 1950s and 1960s, the sablefish export market to Japan developed in the 1970s, fueling the next period of fishery growth (Turris 2000). Harvest has been substantial since the 1970s despite some fluctuations in price (Table 1). The primary management tools used by ADF&G and its pre-statehood predecessor Alaska Department of Fisheries were guideline harvest ranges (GHRs) and season limitations until 1994, when the fishery became an Equal Quota Share (EQS) fishery. This occurred after a series of years in which the GHR was overharvested and seasons were limited to just 24 hours. The EQS system remains in place to the present day, with 88 participants (Table 1). Due to a lack of evidence of recent strong year classes and concerns that current stock levels remain low compared to historic levels, the GHR has declined from 4,761,905 round pounds in 1994 to 1,070,000 round pounds in 2009. The price per pound for sablefish has been consistently high since 1994. The fishery has been limited to longline gear since 1981.

## HARVEST AND REGULATION HISTORY, 1906–2009

The first recorded commercial sablefish landing in Southeast inside waters was landed as bycatch in the halibut fishery in 1906 (Kolloen 1944, Bergmann 1975), like the majority of early sablefish landings. A directed landing was recorded as early as 1913. Effort and prices increased during World War I, during which time the market name “sablefish” was introduced in favor of “blackcod,” but the fishery declined after the war (Figure 2; Bracken 1983).

The 1940s saw a major spike in sablefish fishing effort (Figure 2), due in large part to vitamin industry demand for sablefish livers (Bracken 1983), and military demand for vitamin A supplements to enhance soldiers’ night vision (United Press 1942). In 1943, the price per pound for sablefish was 10 cents for the flesh, 35 cents for the viscera and \$1.65 for the liver (Kolloen 1944). The highest estimated sablefish harvest recorded in the NSEI area was in 1947, at 6.5 million pounds. During this time, fishermen experimented with halibut gear modifications to specifically target sablefish. In 1948, the fishing vessel *Wolverine* began targeting sablefish with small-eyed hooks and 9 to 13 foot hook spacing (Bracken 1983). It was believed that the smaller hooks would reduce the loss of fish due to spin-off as the gear was hauled to the surface. The Alaska Department of Fisheries conducted a gear comparison survey in Chatham Strait in 1949 and concluded that catch per skate of sablefish was greatly improved when using the new gear compared to standard halibut gear (Edson 1954).

Along with the increased effort and efficiency that occurred during the 1940s, there were declines in CPUE and average fish weight. The fleet moved out of Frederick Sound, once a prime fishing ground, due to diminished catch, and into Chatham Strait (Figure 1). The commercial fleet expressed concern that the spawning stock was being heavily harvested and requested a season limitation (Appendix A; Kolloen 1944). The season was reduced in 1945 from year round to between mid March and late November. The department did not establish a quota.

Harvest levels and prices slumped after the 1940s (Figure 2) due to the end of the war, development of synthetic vitamins, and a surplus of sablefish meat in cold storage facilities. The fishery continued to be slow through 1971 as prices remained low (Turris 2000), CPUE was not as high as it had been, and there were some years of bad weather and opportunities in other fisheries (Bracken 1983). During the 1970s, the sablefish export market to Japan began developing and interest in sablefish fishing increased again (Turris 2000). At the same time there was a large international (Canadian and Japanese) sablefish fishery in the waters offshore from Southeast Alaska (Bracken 1983).

The department shortened fishing seasons and implemented guideline harvest ranges (GHRs) as effort escalated in the 1970s and 1980s (Figure 2, Appendix A; Bracken 1983). The fishery which had been open to both longline and pot gear was restricted to longline gear only in 1981. An industry recommended harvest limit of 1 million dressed pounds was implemented in 1973. ADF&G recommended a reduction in quota to 850,000 dressed pounds in 1979 and then moved to a guideline harvest range of 500,000 to 900,000 dressed pounds in 1980 based on historic catches. Fleet effort and efficiency continued to increase dramatically and by 1984 the season was reduced to five days in the NSEI area. In 1985, a limited entry program was implemented for the sablefish fishing fleet in NSEI and the guideline harvest range (GHR) was set at 500,000 to 1,500,000 dressed pounds. Still, the overall operating efficiency of the NSEI longline fleet increased seven fold after the limited entry program was established. The average number of hooks set per vessel per day increased from 4,791 in 1984 to 28,514 in 1993. In order to stay within harvest objectives, the department continued to reduce the number of fishing days. The season length went from 76 days in 1980 to one day in 1987. A one-day opening continued until 1993. In that year, the fleet harvested 3,640,000 dressed pounds, 2,140,000 pounds over the upper bounds of the 1,500,000 dressed pound GHR.

The fishery catch per unit effort (CPUE) (round pounds per hook) was low in the early 1980s, increasing in the mid 1980s with the recruitment of very strong year classes (Figure 3; Carlile et al. 2002). Due to these strong year classes the CPUE remained above 1 pound per hook from 1982 through 1993. However, the CPUE began to decline after 1993.

In an effort to improve management and to promote a safer fishery, the Alaska Board of Fisheries (BOF) adopted an EQS system for the NSEI fishery beginning in 1994, to be evaluated in 1997 (Appendix A and B). This plan was recommended by a working group of industry representatives and state fisheries managers after extensive negotiations. Under the EQS system each permit holder was given an equal share of the annual quota and the season was extended. The upper end of the GHR was increased to 3 million dressed pounds (4.76 million pounds round weight) at the time this system was implemented. The EQS system was made permanent in 1997 based on fleet and department recommendations. Logbooks detailing catch and effort by set became mandatory (Appendix C). At that same time the season was set in regulation for September 1 through November 15 and the GHR was set at 1.59 to 4.8 million round pounds. Annual EQSs have ranged from 12,710 to 41,700 round pounds (Table 1). The EQSs vary annually based on the total quota and number of legal participants for that year. Sablefish harvest has been extremely close to the harvest objective since the beginning of the EQS system, although there have been some individual overages (Figure 2, Table 2).

In 1994 the fishery pound-per-hook CPUE began to show a marked decline (Figure 3). A declining fishery CPUE between 1993 and 1994 was not unexpected because of the change in management from a derby style to the EQS fishery. However, the decline in fishery CPUE

beginning in 1994 was of concern. The round pounds-per-hook CPUE continued to decline until 1998 when it leveled off at 0.49 round pounds-per-hook, the lowest fishery CPUE recorded since 1980. It remained at this level until 2002 when it increased notably to 0.63 round pounds-per-hook. In 2003 it increased further to 0.75 round pounds-per-hook.

Due to poor fishery performance over the prior 5 years (Figure 3) and acknowledgement of the general decline in sablefish abundance coastwide (Sigler et al. 1997), the fishery annual harvest objective (AHO) was lowered 35% in 1999 from 4.8 million round pounds to 3.12 million round pounds (Figure 2). ADF&G further lowered the AHO by 30% in 2001 to 2.184 million round pounds based on fishery CPUE trends and an ADF&G mark-recapture-based estimate of exploitation rate. The 2002 AHO was set at 2.005 million round pounds based on an exploitable biomass estimate from the 2001 mark-recapture project and adjusted for bycatch mortality estimates (Richardson and O'Connell 2002, Carlile et al. 2002). An outside review panel of experts from other fisheries met during this year to discuss the ADF&G stock assessment program and suggest changes for future years (Leaman et al. 2002). The 2002 AHO remained in place for 2003 (Richardson and O'Connell 2003). The biomass and  $F_{40\%}$  ( $F_{40\%} = 0.137$ ) harvest rate estimates were updated for 2004, and the AHO was increased to 2.245 million round pounds. The 2005 AHO was lowered to 2.053 million round pounds based on the same  $F_{40\%}$  ( $F_{40\%} = 0.137$ ) harvest rate applied to an updated biomass estimate from the 2004 mark-recapture project. The 2005 allowable biological catch (ABC) and total allowable catch (TAC) were rolled over and used for the 2006 fishery. An updated biomass estimate and updated  $F_{40\%}$  harvest rate ( $F_{40\%} = 0.116$ ) were applied to the 2007 fishery, and the AHO was 1.488 million round pounds. The 2007 biomass estimate and harvest rate ( $F_{40\%} = 0.116$ ) were both rolled over for the 2008 fishery so that staff time could be spent producing a detailed stock assessment report (Dressel, 2009). The resulting AHO was slightly higher in 2008 because the amount decremented for the halibut fishery was reduced due to reductions in the halibut quota. The 2008 AHO was 1.508 million round pounds. For 2009 a new biomass estimate was provided and the harvest rate was updated. The AHO for 2009 is 1,071,000 round pounds and the harvest rate was set at  $F_{45\%}$  ( $F_{45\%} = 0.104$ ). The 2009 AHO was based on an updated biomass estimate from the 2008 mark-recapture project, an  $F_{45\%}$  harvest rate, and decrements for other fisheries and the ADF&G sablefish longline survey harvest. For a detailed review of the  $F_{40\%}$  harvest policy and theory see Field (2002).

The work performed by the consultant hired in 2007 by the department to evaluate stock assessment methods revealed that the stock level in Chatham Strait is at a low level relative to the historic unfished biomass and the harvest rate used in 2007 and 2008 was unsustainably high for a population at this level. For this reason the department announced its intention in 2008 to proceed with caution and conservatism with regard to the harvest of sablefish from Chatham Strait, but gave the industry some time to adjust to this information. The department used a more conservative harvest rate to determine the 2009 AHO.

The NSEI sablefish fishery is important to the Southeast Alaska economy. The price of sablefish has been consistently high since the EQS system began (Table 1). 1994, 1995, and 1998 were the only years in which the price was less than \$2.00 per round pound.

As a result of consistently high sablefish prices, Commercial Fisheries Entry Commission (CFEC) NSEI permanent sablefish permits have steadily increased in value over time and are among the most valuable fishing permits statewide. The CFEC has estimated the value of a permit to be over \$300,000 since spring 2007. Permits are not administered by ADF&G.

Detailed information regarding permits and licensing should be obtained directly from the CFEC by phone at (907) 789-6150 or online at <http://www.cfec.state.ak.us>.

## **BOARD OF FISH CHANGES IN NSEI SABLEFISH COMMERCIAL FISHING REGULATIONS, 2003–2009**

During the January 2003 Alaska Board of Fisheries (BOF) meeting, the BOF made several changes in regulations affecting the NSEI sablefish fishery. The regulations put into place during that meeting were:

- The opening date for the fishery was changed to August 15 instead of the prior opening date of September 1, giving families some time to fish before the beginning of the school year.
- Randomly selected permit holders may fish outside of the regular season at the department's request and under the terms of a Commissioner's permit to gather biological and catch data during years when the final AHO is determined by January 1.
- Permit holders are allowed to release healthy sablefish but are required to document the number of fish released in their logbook. All injured or dead sablefish must be retained.
- The retention of sablefish for use as bait is prohibited in state waters.
- Permit holders are allowed to carry over up to 5% of their annual equal quota share as an overage or underage. The initial regulation stated permit holders could transfer up to 5% of their legal harvest to another permit holder, but this was repealed in 2006.
- Sablefish regulations were updated to clarify data sources used by the department for setting annual guideline harvest limits.
- Record keeping requirements for permit holders specified they must maintain inseason records of their cumulative catch and provide this information to buyers.
- Thornyhead, shortraker, rougheye and redbanded rockfish may be taken only as bycatch.

In 2006, the ability of fishermen to transfer overages was repealed because it proved to be problematic. The details of the transfer requirements, such as whether the overage recipient must be at the processor to receive the overage or whether transfer agreements must be reached before fishing, were not enumerated in the provision. It was also noted some permit holders began fishing trips after finishing their annual EQS, then transferred the overage to other users. This was not the intent of the regulation. Finally, while the majority of permit holders did not utilize the provision, the few transfers that were made were difficult to track in the fish ticket system. The Board of Fish did renew the overage/underage provision without the transferability, which had been due to sunset in May 2006.

No changes that directly affect commercial sablefish operations were made at the 2009 BOF meeting. However, regulations requiring that sablefish caught by sport fishermen be reported specifically in charter logbooks and creel surveys instead of being reported as "other" species will give commercial fisheries managers more information about the magnitude of the sport sablefish catch than they have had in the past.

## **PARTICIPATION**

Between 1975 and 1984 the fleet size ranged from a low of 46 permits in 1982, to a high of 125 permits in 1976 (Table 1). In 1985 the Commercial Fishery Entry Commission (CFEC) implemented the limited entry program for the NSEI sablefish fishery with the objective that

there would eventually be approximately 73 permanent permit holders. As of the beginning of 2009 the CFEC has 11 cases yet to be decided. Five of these cases are currently in litigation. Of the 88 permits that may fish in 2009, 59 are permanent permits and the remainders are interim use permits. Twenty-six permanent permits are still in the name of the original permit holder. Permits are not administered by ADF&G. Detailed information regarding permits and licensing should be obtained directly from the CFEC by phone at (907) 789-6150 or online at <http://www.cfec.state.ak.us>.

## RESEARCH ACTIVITIES

### STOCK ASSESSMENT

In 1988, annual longline surveys (Richardson 2003a, Richardson 2003c, Richardson 2003e, Vaughn and Sayer *In prep*, Sayer and Vaughn *In prep*) began which provided the department with a fishery independent estimate of CPUE measured at set survey stations, an independent estimate of sablefish longline bycatch, and the ability to collect age, weight and length (AWL) measurements from a sample of sablefish unaffected by commercial fishery selectivity. The fishery and biological information available to ADF&G prior to 1988 was derived from limited ADF&G surveys, at sea sampling on those surveys and tagging efforts which were conducted opportunistically. Additional information was obtained from voluntary logbooks or dockside interviews provided by fishermen. The survey design was modified during the early years of implementation but has been consistent since 1997 (Appendix D). Current longline survey methods are also consistent with federal survey methods, allowing for comparison of sablefish CPUE between state and federal waters (Richardson 2003a).

Mark-recapture studies have been conducted since 1997 (Carlile et al. 2002, Richardson 2003b, Richardson 2003d, and Richardson 2001). These studies involve marking and releasing a subsample of sablefish and then using the proportion of recovered marks among the total number of fish captured in the commercial fishery to estimate the population size. Fish were marked from a longline vessel from 1997 to 1999, but in 2000 ADF&G switched to using pots to capture sablefish for marking because fish captured with longline gear exhibited hook shyness during the year of marking. Marking occurs in NSEI during June, and marks are distributed among statistical areas in proportion to the commercial catch taken from each area. Marks are also distributed across different depths within each statistical area, approximating as closely as possible the distribution of commercial fishery sets with the constraint of reaching overall marking goals within the time contracted for the survey. Fishery logbooks are used to determine the distribution of commercial sets by statistical area and depth. Marked and unmarked fish are counted by ADF&G personnel when fish are delivered to the processor. Fishermen are encouraged to turn in tags and to note the recovery location of tagged fish in exchange for rewards, and to be entered in an annual drawing for cash prizes. Fish processor workers are also encouraged to turn in tags to receive a reward (Carlile et al. 2002).

A private consultant was hired in 2007 to evaluate current stock assessment methods for Chatham Strait sablefish and to explore alternatives. The consultant's review suggests that the development of an age-structured assessment (ASA) model that incorporates mark-recapture information is the preferred option for fully integrating the available data for sablefish in Chatham Strait (Mueter, in prep.). An ASA model can incorporate a number of data types measured over time, such as fishery and survey weight at age, fishery and survey CPUE, fishery and survey age or length compositions, fishery or survey sex composition, mark-recapture

estimated abundance, survey maturity at age, and commercial catch. An ASA model can provide a reconstruction of historical abundances and an evaluation of current stock status relative to historical and unfished levels. It can also estimate important management parameters. The consultant's recommendations are projected to be published by ADF&G before 2010.

In addition to the stock assessment, other sources of information used by ADF&G to assess the fish population condition are biological data from a subsample of fish caught in the commercial fishery and longline survey (age, weight, length, and maturity (Appendix F)), logbooks (Appendix C), and personal communication with fishermen. Dockside port sampling began in 2000 and logbooks became mandatory in 1997 and increased in detail in 2003. Fishery CPUE is calculated using commercial fish ticket records and commercial logbooks, adjusting for hook spacing in the manner of Sigler (2000; Appendix E). All this information can influence management decisions regarding research design and the quota for the following year.

ADF&G began estimating unreported fishing mortality of NSEI sablefish in 2002 and subtracting it from the allowable biological catch (ABC) to obtain the AHO. The halibut fishery bycatch mortality is estimated based on bycatch rates of sablefish caught during the International Pacific Halibut Commission (IPHC) annual longline survey on stations in NSEI that are deeper than 100 fms. This rate is then applied to the estimated amount of halibut likely to be caught in NSEI in the coming year using the current year halibut quota. A portion (25%) of this sablefish bycatch from the halibut fishery is assumed to be deadloss. In addition 3% of the ABC is subtracted to account for fish taken in subsistence, personal use and sportfish fisheries and as deadloss in non-halibut fisheries. There has been little information available as to the magnitude of most of these other sources of mortality, but the Department of Fish and Game Sport Fish Division will begin estimating the sablefish sport catch by the end of 2009.

## **ADDITIONAL RESEARCH**

Sablefish are known to move extensively throughout their range. State, federal, and international agencies have cooperated in order to track fish movement with tagging methods. Fish were tagged and released in early years in cooperative studies with NMFS, on several ADF&G surveys and opportunistically on other historic surveys in order to provide more information about adult sablefish movement. ADF&G maintains a database of tag and recovery locations of fish tagged with ADF&G tags. ADF&G also returns other agency tags recovered in state commercial fisheries or on ADF&G surveys to each appropriate agency.

In 2003 a regulation went into effect allowing limited fishing outside of the regular season for research purposes and by commissioner permit only. This regulation was implemented as a result of a public proposal requesting that the NSEI sablefish fishery season be concurrent with that of the federal IFQ halibut fishery, and the fact that the department did not have any data on the stock condition during the first half of the proposed season. In 2004 and 2005 permit holders were randomly selected from a list of permit holders who expressed interest in fishing in winter and spring under terms specified by the commissioner for the purpose of gathering fishery and biological information outside of the regular NSEI season. An ADF&G observer was on board each vessel to facilitate bycatch accounting and sablefish sampling, and to scan for passive integrated transponder (PIT) tags released by the department the previous season.

In the experimental off-season fisheries, fishing was poor in January and early February. Sablefish were less available to the gear than during the regular NSEI sablefish season and there was a greater proportion of immature fish present. It is unknown what the primary cause for that

was, but it is possible that either mature sablefish were present but spawning and uninterested in the gear, mature fish were not residing in Chatham during spawning, or dogfish were outcompeting sablefish for the hooks. Of the few mature fish that were caught, most were ripe. There was extremely high dogfish bycatch during January and February, and dogfish outnumbered sablefish on some sets.

Fishing in the off-season fishery improved with an increase in catch rates after late February, with more large mature fish captured. Fishing was thought to be good in part because the vessels did not have the possibility of making sets in an area that had just been set by another vessel unbeknownst to them, as occurs in the regular season. In 2005, the off-season fishery tended to catch more, and smaller, males compared to the regular season. The mean length of males was 63.5 cm in the off season and 65 cm in the regular season, while it was 72 cm for females during both seasons.

The off-season fishery can only be opened if the AHO for the coming season is determined by January 1 of that year. This has not occurred during 2006 through 2009. Researching the off season fishery also became difficult for the department due to the logistics of placing staff on vessels, situations which endangered staff, and compliance problems such as fishing in areas other than those requested for research and over-harvesting quotas.

The department conducted a study to evaluate the use of passive integrated transponder (PIT) tags to mark sablefish in 2004. These are internal tags that can be automatically detected by receivers installed in processing plants. In June 2004, using a chartered pot vessel, ADF&G marked 6,357 sablefish with PIT tags and with a blind mark. Recovery of the PIT tags took place in Sitka throughout the 2004 regular season. Adequate detection rates could not be achieved and so it was determined that there were insufficient benefits to the use of PIT tags to justify their cost. If the tag and recovery effort had been successful the use of PIT tags could have increased the detection rate of the number of marked fish landed, allowed estimation of abundance by size strata, and increased efficiency of the recapture phase of this study (Carlile et al. 2002).

The department provided 6 sablefish from the 2003 NSEI longline survey for the Department of Environmental Conservation (DEC) Environmental Health Fish Monitoring Project for sampling for heavy metals (arsenic, cadmium, lead, chromium, selenium and nickel and methyl mercury). These fish were included in a sample of 40 sablefish collected statewide. The analysis revealed low levels of all heavy metal contaminants tested. According to the Alaska Division of Public Health, the concentrations of heavy metals that were detected are not a public health concern. More in-depth data on heavy metals can be found at [www.state.ak.us/dec/animal/fm-heavymetals.htm](http://www.state.ak.us/dec/animal/fm-heavymetals.htm), and [www.state.ak.us/dec/deh/fishsafety.htm](http://www.state.ak.us/dec/deh/fishsafety.htm).

A research study was performed to determine the accuracy of macroscopic maturity staging of sablefish (Appendix F). In August 2007 ovary samples and data including fork length, weight, and maturity stage were collected from 215 female sablefish during the ADF&G longline survey in the NSEI management area. The maturity stage was determined based on gross morphology, such as color and size of the ovary and egg visibility. Ovary samples were preserved and later prepared for histological analysis by staining, embedding in wax, and thin slicing. Samples were then examined under a microscope to determine the maturity stage of each ovary. The maturity classification assigned based on microscopic analysis was compared to the macroscopic classification determined during the survey. The analysis confirmed macroscopic maturity staging is appropriate overall and for the determination of whether or not fish are mature or immature (information that is

used in the stock assessment). However, at the “maturing juvenile” stage it was interesting to note that at least half of the sablefish appeared to be ready to spawn in the approaching season as expected, but half may not spawn until the following spawning season.

## **2008 COMMERCIAL FISHERY**

### **COMMERCIAL FISHERY**

The annual harvest objective (AHO) for the Northern Southeast Inside (NSEI) sablefish fishery was 1,508,000 round pounds. The AHO was slightly higher than the 2007 AHO of 1,488,000 round pounds because a reduction in halibut quota led to a decrease in the amount of sablefish estimated to be deadloss from halibut fishery bycatch. The total directed harvest in 2008 was 1,513,040 round pounds, 100.3% of the AHO (Table 2). The total amount of round pounds that could legally be harvested after accounting for legal overages from the 2007 season was 1,503,937. There were 96 eligible permit holders in 2008, seven fewer than in 2007 (Table 1). The 2008 individual quota share (EQS) was 15,710 round pounds, an 8.3% increase from the 2007 EQS of 14,500 round pounds. The AHO was 2,053,000 round pounds in 2005 and 2006, and 2,245,000 round pounds in 2004. There were 105 eligible permit holders in 2006, 106 in 2005, and 108 in 2004.

2008 was the 5th year during which personal quota shares (PQS) were produced to accommodate overages and underages. The department sends every permit holder a certified letter before the commercial fishing season which states the number of pounds that will be added to or deducted from their personal quota share (PQS) in the upcoming season. For 2008 the maximum amount that could be carried forward from 2007 was 723 round pounds, and the maximum amount that could be carried forward to 2009 was 786 round pounds (Table 2). Fifty permit holders reported legal overages totaling 21,213 round pounds in 2008. There were seven vessels with illegal overages, totaling 3,155 round pounds. Since the overage/underage provision was created, the amount of pounds landed illegally has fluctuated. The highest amount of pounds landed illegally in this period was 9,248 in 2005 and the lowest was 1,100 in 2003. In the years immediately prior to the overage/underage provision, over 10,000 round pounds of sablefish were landed illegally per year.

The average ex-vessel price reported at the time of landing for NSEI sablefish in 2008 was \$3.15 per round pound, up from \$2.67 in 2007. This yielded an ex-vessel value of approximately 4.7 million dollars for the total harvest.

In 2008, 96 permit holders using 71 vessels made a total of 123 fishing trips (125 landings) (Table 2). Fifty seven percent of permit holders made one landing for their entire season, and an additional 35% finished their season in two landings. Over 60% of the vessels that participated in the 2008 fishery have participated each of the past 10 years. Since 1994, when the fishery became EQS, the number of vessels participating in the fishery has decreased 37% and the number of permits has decreased 21%. This indicates an increase in the number of permit holders sharing trips on one vessel.

In 2003 the opening day for the NSEI fishing season was changed in regulation from September 1 to August 15. This change in season has had the effect of slowing participation on opening day (Table 2). This year, for the sixth consecutive year, the NSEI sablefish fishery opened at 8:00 A.M. on August 15, 2 weeks earlier than 1997–2002, and remained open through noon November 15 as set in regulation (5AAC28.110(a (1))). In 2008, 17% of the fleet (12 vessels)



began fishing on opening day, down from 29% (22 vessels) in 2007. In contrast, the 2002 fishery opened on September 1 and 53 (62%) of the vessels fished on opening day. Opening day participation was similarly intense in 2000 and 2001. The trend in vessels fishing in the opening week of the season is similar to that of opening day. The decrease in early participation is due in part to a portion of the fleet participating in other August fisheries, especially the salmon seine fishery.

The majority of the NSEI harvest continues to come from the two statistical areas in central Chatham, 345631 and 345701 (Figures 4 and 5). In 2008 the combined harvest from these two statistical areas represented 74.6% of the total harvest, which is an increase from 62.1% in 2007, 63.2% in 2006 and 66.5% in 2005.

In 2008, the majority of landings (46%) were made in Sitka. Twenty-nine percent were made in Petersburg and 12% in Juneau. Small portions of the catch were landed in Hoonah, Wrangell, and Ketchikan, and caught onboard a floating catcher/processor.

The distribution of landings has changed since 2001. In 2001, 42% of sablefish landings were made in Petersburg and 32% were made in Sitka. Since then, the proportion of Petersburg landings has decreased each year except in 2006, and the proportion of landings in Sitka has increased every year. The proportion of the catch landed in Juneau has fluctuated around an average of 15%, and in Hoonah around an average of 7%. At least one landing has been made in Kake, Wrangell, Ketchikan, Excursion Inlet, Pelican, at floating processors, at other Alaskan ports, or in Bellingham, WA since 2001. These minor ports combined make up less than 10% of the total landings every year. Landings made outside of Alaska require coordination with additional agencies and additional permits (Appendix G).

In 2008, over 97% of the harvest was landed round, with just under 3% landed eastern (or j) cut. The same proportion of the harvest was landed round in 2007. About 2,240 pounds, or 0.2% of the total harvest, were landed as personal use. This is an increase from 2007 when 1,699 round pounds (0.1%) were landed as personal use. In 2006, 2005, and 2004, 0.1% of the harvest was landed as personal use.

## **CPUE**

Longline gear used in the fishery has variable hook spacing. Therefore fishery hook spacing is standardized before CPUEs are calculated using the formula found in Appendix E. Fishery CPUE has increased over the past ten years (Figure 3). The 2008 CPUE was .91 round pounds per standardized hook, the highest CPUE in at least ten years. The 2004–2006 seasons' CPUE remained fairly constant at 0.71. In 2007, fishery CPUE increased to 0.81. The CPUEs for 1999–2008 are still well below the extremely high CPUEs of the early 1980's that were supported by exceptionally strong year classes.

Both conventional gear and snap-on gear are used in the NSEI sablefish fishery. In 2008, 93% of the hooks were set using conventional gear. The remainders were set using snap-on gear. During 2004 through 2007, between 95% and 96% of hooks were set using conventional gear. If not standardized for hook spacing the average CPUE of sets using snap on gear was higher in all years than the CPUE of sets using conventional gear because of the considerably wider hook spacing used in snap on gear.

For comparison the 2008 longline survey CPUE was 1.7 round pounds per hook, an increase from 1.6 in 2007 and 2006, but lower than the 2005 CPUE of 2.0 round pounds per hook. The lowest survey CPUE of the past five years was 1.5 in 2004, and the lowest survey CPUE of the

past ten years was 1.2 in 1999 and 2000 (Figure 3). Hook spacing in the longline survey is 2 meters which is consistent with NMFS survey gear specifications.

## **BIOLOGICAL DATA**

Neither the commercial fishery nor survey length data show evidence of significant recruitment in the years 2000–2008. The fishery length frequency distribution has changed since 2000 with the curve steepening and shifting to the right (Figure 6, Figure 7, Figure 8). There has been a steady increase in average fork length of harvested fish, from a low point of 65 cm in 2001 to 71 cm in both 2007 and 2008. The length frequency distribution of female fish harvested in the commercial fishery has steepened more dramatically than the length frequency distribution of male fish between 2002, the first year during which commercial samples were sexed, and 2008 (Figure 9). If the shift in commercial fishery sample length distribution was due primarily to increased release of small fish (high grading) or increased targeting of large fish, survey length frequency data would be unchanged from 2000 to 2008. However, the survey length frequency distributions also show a steepening and shifting over time.

Compared to the commercial fishery, the survey consistently has a higher frequency of fish that are less than 50 cm long, which contributes to the slightly smaller average size (Figure 6, Figure 7, and Figure 8). The differences between the survey and commercial fishery data suggest that, although the change over time in average fish size is likely due to a lack of recruitment in the fishery, there is also some release of smaller fish and potentially targeting of larger fish in the commercial fishery. This is not surprising, as the price per pound for larger fish is higher than the price per pound for smaller fish, and anecdotal evidence suggests some commercial fishermen believe it is beneficial to the fishery to release fish less than about 50 cm long.

Age data also show a lack of recent recruitment to the fishery. The age distribution has narrowed in the commercial fishery between 2002, the first year during which commercial samples were aged, and 2008 (Figure 10). The NSEI commercial fishery was primarily dominated by fish between 7 and 9 years old from 2002 through 2007, and 6 year old fish were very abundant in addition to 8 year olds in the 2004 fishery (Figure 10). Ten year old fish were the most abundant in the 2008 commercial fishery.

There is a longer record of age samples from the longline survey than the commercial fishery. Age samples from the longline survey show a dramatic change in the shape of the age distribution between the 1990s and recent years (Figure 11). In years 2003–2008 there are fewer age classes over all and very few young fish. In the years 1992–2000 the age data shows strong recruitment and evidence of significant age classes of older fish.

The age data from NSEI do not clearly show individual strong year classes that can be tracked through time. Tag data suggests that once recruited in NSEI, most sablefish are resident and therefore it is expected that it would be possible to track strong year classes (Carlile et al. 2002). It is possible that sablefish are recruiting into the NSEI area at a variety of ages by emigrating from other areas. If this is occurring it could mask the progression of year classes that might normally be evident when fish recruit to a population at a single young age, or series of younger ages, and then progress, over time, through the population. Sablefish are difficult to age (Pearson and Shaw 2004) and aging errors may also mask the contribution of strong year classes to the fishery. The NMFS Gulf of Alaska (GOA) stock assessment lists the 1997 and 2000 year classes as strong recruitments and the 1995 year class as average (Hanselman et al 2007).

The sex ratio of the survey and of the fishery samples has changed since 2002, the first year from which sex data are available. The percentage of males in the regular season fishery decreased from 45% in 2002 to 34% in 2008. The longline survey sex ratio has also changed but not as dramatically. It decreased from 54% in 2002 to 44% male in 2008. It is difficult to evaluate how much of this change is due to gear selectivity and how much indicates an actual change in population sex ratio. Longline gear generally selects for larger fish and females reach a larger maximum size and grow faster than males. The sex ratio data for sablefish sampled on the mark-tag survey using pot gear, which is not as selective for larger fish as longline gear, was 45% male in 2002 and 40% male in 2008.

The maturity data from port samples show a decline in the proportion of fish in maturity categories 1 and 2, immature and developing to maturity, from 25% in 2002 to 3% in 2008 (Appendix F). The percentage of 1's and 2's was 5 in 2007 and 2006, was 8 in 2005, and 14 in 2003. This decline in young immature fish is consistent with the noticeable lack of recruitment into Chatham.

Average weight has increased in the last 6 years which could be the result of a lack of recruitment or may be the result of the increased proportion of female fish in the catch. The average round weight of fish sampled from the 2008 commercial fishery was 4.1 kg (9.0 lbs), an increase from the 2002 average of 3.8 kg (8.3 lbs). The average weight was also 4.1 kg (9.0 lbs) in 2007. It was 4.0 kg (8.8 lbs) in 2006 and 2005, and 3.7 kg (8.2 lbs) in 2003 and 2004.

## **FISHERY BYCATCH**

There were 57,598 round pounds of thornyhead, 9,215 round pounds of shortraker, and 8,723 round pounds of roughey rockfish landed as bycatch in the 2008 NSEI sablefish fishery (Figure 12). Other bycatch species landed, in order of abundance, were redbanded rockfish (*Sebastes babcocki*), Pacific cod (*Gadus macrocephalus*), arrowtooth flounder (*Atheresthes stomias*), yelloweye rockfish (*Sebastes ruberrimus*), and silvergray rockfish (*Sebastes brevispinus*). There were 1,022 round pounds of redbanded rockfish landed; less than 1,000 round pounds of each of the other species were landed during the fishery. Skates (Rajidae), Dover sole (*Microstomus pacificus*), additional quantities of arrowtooth flounder and other flatfish, and Pacific sleeper sharks (*Somniosus pacificus*) are also caught as bycatch but are typically discarded at sea.

The combined total of thornyhead, shortraker, and roughey rockfish round pounds landed on trips targeting sablefish has been about 5% or 6% of the round pounds of sablefish landed on sablefish target trips since 2003 (Figure 12). This is a decline from 7% in 2002, 10% in 2001, and a peak of 15% in 2000. Prior to 2003, fish caught in excess of sablefish bycatch limits could be landed and sold on miscellaneous finfish permits. Fish were considered bycatch in the sablefish fishery in this report regardless of the permit on which they were landed if they were caught during trips in which sablefish were targeted. In 2003, the Board of Fish made shortspine thornyhead, roughey, and shortraker rockfish bycatch only species. Therefore, any amount of these rockfish caught in excess of bycatch limits must either be retained for personal use, donated to charity, or sold with the proceeds going to the state.

Since July 2000, a full retention policy has been in place for inside state waters that requires all *Sebastes* rockfishes caught to be landed and weighed. Shortspine thornyhead are *Sebastolobus* and not *Sebastes* rockfish. They were not included in this requirement because they do not have a swim bladder and therefore do not incur embolism mortality, and can be released unharmed.

The catch of sharks or skates can occasionally be in excess of 1,000 pounds in a trip and sometimes as high as 4,500 pounds, but the true magnitude of the bycatch can not be known because the fish are not weighed or well counted before being discarded and reporting diligence of at-sea discards is variable. Sharks are a nuisance to fishermen as they become tangled in the gear and can not be sold. Skates up to their bycatch limit can legally be sold but processors do not always purchase them.

Halibut are also taken in the sablefish fishery and can be landed as part of a permit holder's International Pacific Halibut Commission (IPHC) individual fishing quota (IFQ), if applicable. They are then technically considered a target species in a dual fishery. If the permit holder does not have IFQ or has already caught their IFQ for the year, halibut must be released at sea. Halibut observed as bycatch in ADF&G longline surveys typically survive capture and appear vigorous when they are released.

## **2009 COMMERCIAL FISHERY**

The 2009 NSEI sablefish fishery opened August 15 at noon and will run through noon on November 15<sup>th</sup>. There are 88 permit holders eligible to fish during the 2009 season.

### **BIOMASS ESTIMATE**

The estimate of sablefish abundance in NSEI at the time of the 2008 fishery was calculated using mark-recapture methods and the Petersen estimator. From this estimate, a forecast of biomass for 2009 was developed by decrementing for natural mortality, adding for recruitment, and converting from fish abundance to biomass. A harvest rate was then applied to the forecasted biomass to obtain the allowable biological catch (ABC). For 2009, a harvest rate of  $F_{45\%}$  (0.104) was applied to the point estimate of the 2009 forecasted biomass. After deducting for deadloss in the halibut fishery, subsistence, personal use, sport fishing and deadloss in non-halibut fisheries this resulted in the AHO for the fishery being 1,071,000 round pounds which is a 29% drop from the 2008 AHO (1,508,000).

For a detailed reporting of the stock assessment methods used for the 2007 NSEI sablefish AHO, see Dressel (2009). The methods used for calculating the 2009 AHO were nearly identical to those used for the 2007 AHO with three notable changes. These are:

- For 2009, a more conservative harvest rate was used ( $F_{45\%}$  (0.104)) instead of  $F_{40\%}$  (0.116).
- For 2009, the harvest rate was applied to the point estimate of the sablefish biomass forecast, whereas for 2007 the harvest rate was applied to the 90% lower confidence interval of forecasted biomass
- For 2009, an additional decrement (estimated testfish harvest from the 2009 longline survey) was incorporated. This estimate was derived by using an average of the previous 3 years of testfish landings.

### **UNREPORTED MORTALITY**

Sablefish are taken incidentally in fisheries for other species, most notably in the halibut longline fishery. There are no data available on the magnitude or mortality of these catches in the commercial fishery, therefore we use data obtained from the International Pacific Halibut Commission (IPHC) to estimate the likely deadloss in that fishery. We use the most recent

available past year's IPHC fishery catch information to anticipate how the fishing will occur spatially, and IPHC annual survey catch information from the previous year to obtain a ratio of sablefish to legal halibut. We apply this ratio to the current year halibut quotas to estimate the anticipated deadloss for the current year. Inputs for determining deadloss in 2009 were 2007 IPHC fishery information, 2008 IPHC stock assessment survey information and the 2009 halibut quotas. Because the ratio of sablefish to legal halibut have a wide range and change significantly from year to year we use an average of the ratio for the three most recent years. The ratio used in 2009 was 0.658 (2006–2008 average). Only halibut survey stations deeper than 100 fathoms occurring in NSEI are used for this ratio determination. Commercial catch data provided by IPHC indicated that approximately 8.5% of the 2007 2C halibut quota was taken in waters of NSEI in sets deeper than 100 fathoms outside the regular NSEI sablefish season. The 2009 2C quota was 5,020,000 pounds, and the estimated halibut catch that would be taken in waters of NSEI in sets deeper than 100 fathoms outside the regular sablefish season was 426,999 pounds. Applying a 0.658 bycatch rate to this portion of the quota results in a potential bycatch of sablefish of 280,965 round pounds. We assume 25% of this poundage is deadloss, resulting in a 70,241 round pound decrement.

An additional 3% of the ABC is deducted to account for other sources of mortality, which include incidental catch in the crab fisheries, subsistence, sport, and personal use fishing, and discard or unreported mortality in the directed sablefish fishery. Until July 18, 2003, when the use of sablefish as bait was prohibited, sablefish could legally be taken for use as bait from inside state waters. Deadloss in the directed fishery may be the result of sandflea and shark predation, hooking injuries on released fish, and fish lost either before retrieval or because of lost gear.

The combined decrement applied to the TAC for the 2009 fishery to account for the deadloss in the directed halibut fishery, other sources of mortality (3% of the ABC), and removals by the department for test fisheries totaled 220,205 round pounds.

## **DIRECTED FISHERY QUOTA**

The 2009 directed fishery quota will be 1,071,000 round pounds. This is a 29% drop from the 2008 AHO of 1,508,000 round pounds. The individual quota share (EQS) will be 12,710 round pounds (22% below last year's EQS of 15,710 round pounds). The exact poundage allowed for each permit holder fishing in 2009 will be based on the 2009 EQS debited or credited by their legal overage/underage during the 2008 fishery. The maximum amount of pounds that could be carried over to 2009 from 2008 was 786.

Fishermen should have received a certified letter from the Department of Fish and Game issuing their 2009 PQS adjustment amount.

## REFERENCES CITED

- Allen and Smith. 1988. Atlas and zoogeography of common fishes in the Bering Sea and north Pacific. National Oceanic and Atmospheric Administration Technical Report No. NMFS-NWFSC 66.
- Bergmann, W. *Unpublished*. Southeastern region sablefish stock status report, 1975. Prepared for the Program Review Committee, Alaska Department of Fish and Game, Division of Commercial Fisheries, Southeast Region. Juneau.
- Bracken, Barry. 1983. The history of the U.S sablefish fishery in the Gulf of Alaska, 1902–1982. Alaska Sea Grant Report 83-8:41–47.
- Carlile, D. W., B. Richardson, M. Cartwright, and V. M. O’Connell. 2002. Southeast Alaska stock assessment activities 1988–2001. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J02-02, Douglas.
- Dressel, S. C. 2009. 2006 Northern Southeast Inside sablefish biomass estimate and 2007 forecast and quota. Alaska Department of Fish and Game, Fishery Data Series No. 09-50, Anchorage.
- Edson, Q.A. 1954. Preliminary report on the Alaska sablefish fishery. Pacific Marine Fisheries Commission Bulletin 3:39–56.
- Field, J. C. 2002. A review of the theory, application and potential ecological consequences of F40% harvest policies in the Northeast Pacific. Report prepared for Alaskan Oceans Network. School of Fisheries and Aquatic Sciences, University of Washington, Seattle.
- Funk, F. and B. Bracken. 1984. Growth of sablefish in Southeastern Alaska. Alaska Sea Grant Report 83-8:51–57.
- Hanselman, D., C.R. Lunsford, J.T. Fujioka, and C. J. Rodgveller. 2007. Alaska sablefish assessment. Pages 329–446 [in] Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska for 2008. North Pacific Fisheries Management Council, Anchorage.
- Hoening, J. M. 1983. Empirical use of longevity data to estimate mortality rates. Fishery Bulletin 82: 898–903.
- Johnson, S. L. and T. J. Quinn II 1988. Catch-age analysis with auxiliary information of sablefish in the Gulf of Alaska. Contract report to National Marine Fishery Service, Auke Bay, Alaska. Center for Fisheries and Ocean Sciences, University of Alaska, Juneau.
- Kimura, D. K., A. M. Shaw and F. R. Shaw. 1998. Stock structure and movement of tagged sablefish, *Anoplopoma fimbria*, in offshore northeast Pacific waters and the effects of El Nino-Southern Oscillation on migration and growth. Fishery Bulletin 96:462–481.
- Kolloen, L. N. 1944. Sablefishing: Alaska decline calls for closed season. Pacific Fisherman. December 1944:73–77.
- Krieger, K. 1997. Sablefish, *Anoplopoma fimbria*, observed from a manned submersible. Pages 39–44 [in] Saunders and Wilkins, editors. Biology and Management of Sablefish, *Anoplopoma fimbria*. National Oceanic and Atmospheric Administration National Marine Fisheries Service Technical Report No. 130. Seattle.
- Kruse, G. H., F. C. Funk, H. J. Geiger, K. R. Mabry, H. M. Savikko, and S. M. Siddeek. 2000. Overview of state-managed fisheries in the central and western Gulf of Alaska, Aleutian Islands, and southeastern Bering Sea, with reference to Stellar sea lions. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 5J00-10, Juneau.
- Leaman, B., J. Fujioka, G. H. Kruse, M. Saunders, and M. F. Sigler. 2002. An external review of the Chatham Strait sablefish stock assessment program. [in] Richardson, B., and V.M. O’Connell. 2002. The Southeast Alaska Northern Southeast Inside sablefish fishery information report, with outlook to the 2002 fishery. Alaska Department of Fish and Game, Regional Information Report, 1J02-34, Douglas.
- Maloney, N. E and M. F. Sigler. 2008. Age-specific movement patterns of sablefish (*Anoplopoma fimbria*) in Alaska. Fishery Bulletin 106(3):305–316.
- McDevitt, S. A. 1990. Growth and analysis of sablefish (*Anoplopoma fimbria*), from mark recapture data from the northeast Pacific. M.S. Thesis, University of Washington, Seattle.

## REFERENCES CITED (Continued)

- McFarlane, G. A. and W. D. Nagatta. 1988. Overview of sablefish mariculture and its potential for industry. pp. 105–120 [in] Proceedings of the Fourth Alaska Aquaculture Conference. Alaska Sea Grant Report 88-4.
- Pearson, D. E. and F.R. Shaw. 2004. Sources of age determination errors for sablefish (*Anoplopoma fimbria*). Fishery Bulletin 102(1):127–141.
- Richardson, B. 2001. NSEI sablefish marking pot survey cruise report: F/V *Miss Conception*, June 21–July 7, 2001. Alaska Department of Fish and Game Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report IJ01-38, Douglas.
- Richardson, B. 2003a. 2001 NSEI (Chatham) sablefish longline survey report, August 8–August 13, 2001. Alaska Department of Fish and Game. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report IJ03-12, Douglas.
- Richardson, B. 2003b. 2002 NSEI (Chatham) sablefish marking pot survey report F/V *Miss Conception*, June 15–June 30, 2002. Alaska Department of Fish and Game. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report, IJ03-15, Douglas.
- Richardson, B. 2003c. 2002 NSEI (Chatham) sablefish longline survey report, August 13–August 18. Alaska Department of Fish and Game Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report, IJ03-35, Douglas.
- Richardson, B. 2003d. 2003 NSEI (Chatham) sablefish pot survey report, F/V *Melissa Lynn*, June 15–July 3. Alaska Department of Fish and Game. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report IJ03-38, Douglas.
- Richardson, B. 2003e. 2003 NSEI (Chatham) sablefish longline survey report. Alaska Department of Fish and Game Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report IJ03-40, Douglas.
- Richardson, B. and V. M. O'Connell. 2002. The Southeast Alaska northern southeast inside sablefish fishery information report with outlook to the 2002 fishery. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report IJ02-34, Douglas.
- Richardson, B., and V. M. O'Connell. 2003. The Southeast Alaska northern southeast inside sablefish fishery information report with outlook to the 2003 fishery. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report IJ03-36, Douglas.
- Sasaki, T. 1985. Studies on the sablefish resources in the North Pacific Ocean. Bulletin of the Far Seas Fishery Laboratory 22:1-108, Shimizu, Japan.
- Sayer, A.M. and D. D. Holum 2007. The Southeast Alaska Southern Southeast inside sablefish fishery information report with outlook to the 2008 fishery. Alaska Department of Fish and Game, Fishery Management Report No. 08-44, Anchorage.
- Sayer, A.M., and Vaughn, M. *In prep.* 2008 NSEI (Chatham) Sablefish longline survey report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report, Douglas.
- Sigler, M. F., C. R. Lunsford, J. T. Fujioka, S. A. Lowe. 2003. Alaska sablefish assessment for 2004. In: stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska for 2004. North Pacific Fisheries Management Council, Anchorage.
- Sigler, M. F., C. R. Lunsford, S. A. Lowe, and J. T. Fujioka. 2001. Alaska sablefish assessment for 2002. [in] Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska for 2002. North Pacific Fisheries Management Council, Anchorage.
- Sigler, M. F., T. L. Rutecki, D. L. Courtney, J. F. Karinen and M-S Lang. 2001b. Young-of-the-year sablefish abundance, growth, and diet. Alaska Fisheries Bulletin 8(1):57–70.
- Sigler, M. F. 2000. Abundance estimation and capture of sablefish (*Anoplopoma fimbria*) by longline gear. Canadian Journal of Fisheries and Aquatic Sciences 57:1270–1283.

## REFERENCES CITED (Continued)

- Sigler, M. F., J. T. Fujioka and S. A. Lowe. 1997. Sablefish. Pages 255-306 [in] Stock assessment and fishery evaluation report for the groundfish resources of the Gulf of Alaska for 1998. North Pacific Fisheries Management Council, Anchorage.
- Turris, B.R. 2000. A comparison of British Columbia's ITQ fisheries for groundfish trawl and sablefish: similar results from programmes with differing objectives, designs and processes. Pages 254–261 [in] R. Shotton, editor. Use of property rights in fisheries management. Fisheries Technical Paper 404/1, FAO, Rome.
- United Press. 1942. Use of vitamin A restricted by WPB. New York Times, February 10, 1942, p 22.
- Vaughn, M., and A.M. Sayer. *In prep.* 2007 NSEI (Chatham) Sablefish longline survey report. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report, Douglas.
- Wing, B. L. 1985. Salmon stomach contents from the Alaska troll logbook program 1977–1984. NOAA Technical Memorandum NMFS F/NWC-91.
- Wolotira, R. J. Jr., T.M. Sample, S.F. Noel, and C.R. Iten. 1993. Geographic and bathymetric distributions for many commercially important fishes and shellfishes off the west coast of North America, based on research survey and commercial catch data, 1912–84. National Oceanic and Atmospheric Administration Technical Memorandum No. NMFS-AFSC-6.
- Yang, M-S and M. W. Nelson. 2000. Food habits of the commercially important groundfishes in the Gulf of Alaska in 1990, 1993, and 1996. National Oceanic and Atmospheric Administration Technical Memorandum No. NMFS-AFSC 112.



## **TABLES**

Table 1.—Number of permits and vessels, catch, Equal Quota Share (EQS), and price in the NSEI sablefish fishery, 1969–2008.

Year	No. permits <sup>a</sup>	No. vessels	Round lbs landed <sup>b</sup>	EQS	Average price /round lb <sup>c</sup>
1969	—	—	400,521	—	—
1970	—	—	421,344	—	—
1971	—	—	315,692	—	—
1972	—	—	1,089,150	—	—
1973	—	—	977,995	—	—
1974	—	—	815,731	—	—
1975	110	—	984,179	—	—
1976	125	—	970,313	—	—
1977	95	—	559,031	—	\$0.70
1978	80	—	788,523	—	\$0.72
1979	110	—	1,190,356	—	\$0.76
1980	65	—	881,469	—	\$0.42
1981	53	—	710,147	—	\$0.58
1982	46	—	804,004	—	—
1983	68	—	1,165,871	—	—
1984	86	----	1,329,072	—	\$0.25
1985	105	107	2,951,056	—	—
1986	138	144	3,874,269	—	\$0.74
1987	158	163	3,861,546	—	\$0.91
1988	149	147	4,206,509	—	\$1.08
1989	151	149	3,767,518	—	\$0.77
1990	121	119	3,281,393	—	\$1.08
1991	127	122	3,955,189	—	\$1.74
1992	115	115	4,267,781	—	\$1.75
1993	120	114	5,795,974	—	\$0.97
1994	121	112	4,713,552	38,889	\$1.94
1995	121	116	4,542,348	38,889	\$1.70
1996	121	118	4,672,701	38,889	\$2.12
1997	122	111	4,753,394	39,300	\$2.43
1998	116	106	4,688,008	41,700	\$1.57
1999	112	98	3,043,273	28,000	\$2.18
2000	111	93	3,082,159	28,600	\$2.40
2001	111	87	2,142,617	19,600	\$2.13
2002	109	86	2,009,380	18,400	\$2.40
2003	108	88	2,001,643	18,565	\$2.39
2004	108	88	2,229,954	20,787	\$2.03
2005	106	82	2,026,131	19,400	\$2.49
2006	105	80	2,033,786	19,550	\$2.69
2007	103	77	1,501,478	14,500	\$2.67
2008	96	71	1,513,040	15,710	\$3.15
2009 <sup>d</sup>	88	—	—	12,710	—

<sup>a</sup> Prior to 1985 there was not a NSEI sablefish permit card so the number of permits includes sablefish landings made on permit cards for other fisheries. Permit cards were not issued prior to 1975.

<sup>b</sup> Records from prior to 1985 are incomplete; harvest levels were approximated using a variety of sources.

<sup>c</sup> Based on price recorded on fish ticket at time of landing. Initial dock price adjustment payments are included though coop prices are preliminary.

<sup>d</sup> At the publication time of this report the 2009 fishery was still underway.

Table 2.—Summary of NSEI quota share fishery, 2000–2008. All fish quantities are in round pounds.

	2008	2007	2006	2005	2004	2003	2002	2001	2000
Annual Harvest Objective (AHO)	1,508,000	1,488,000	2,053,000	2,053,000	2,245,000	2,005,000	2,005,000	2,184,000	3,120,000
Equal Quota Share (EQS)	15,710	14,500	19,550	19,400	20,787	18,565	18,400	19,600	28,600
Sum of Personal Quota Shares <sup>a</sup> (PQS)	1,503,937	1,498,133	2,053,122	2,061,422	2,241,338	n/a	n/a	n/a	n/a
Allowable over/underage	786	723	978	970	1,039	n/a	n/a	n/a	n/a
Total directed harvest	1,513,040	1,501,478	2,033,786	2,026,131	2,229,954	2,001,643	2,009,380	2,142,617	3,082,159
Percentage of AHO harvested	100.3	100.9	99.1	98.7	99.3	99.8	100.2	98.1	98.8
Illegal overages	3,155	5,254	1,989	9,248	2,402	1,100	17,459	11,930	10,830
Permits with illegal overages	7	10	4	10	9	4	40	—	—
Legal overages	21,213	18,332	16,009	27,861	25,479	21,821	—	—	—
Permits with legal overages	50	45	39	45	46	49	—	—	—
CFEC permits eligible for EQS	96	103	105	106	108	108	109	111	109
CFEC permits fished	96	103	105	106	108	108	109	111	111
Permanent permits	54	43	41	41	41	40	39	—	—
Interim use permits	42	60	64	61	67	68	70	—	—
Permits under court appeal	4	4	4	4	5	4	—	—	—
Total number of vessels	71	77	80	82	88	88	86	87	93
Number of trips	123	140	175	168	203	—	—	—	—
Average no. landings per permit <sup>b</sup>	1.5	1.6	1.9	1.9	2	2.1	2.1	2.7	3.3
Permits finishing in one trip	55	61	44	49	44	41	34	20	10
Permits finishing in two trips	34	27	42	37	39	36	48	43	30
Vessels fishing opening day	12	16	20	38	26	25	52	48	61
CPUE standardized for hook spacing (rnd lbs/hook)	0.90	0.81	0.71	0.71	0.71	0.75	0.63	0.50	—
Average price of NSEI sablefish	\$3.15	\$2.67	\$2.69	\$2.49	\$2.03	\$2.39	\$2.40	\$2.13	\$2.40
Fishery ex-vessel value in millions	\$4.7	\$4.0	\$5.4	\$5.0	\$4.5	\$4.8	\$4.8	\$4.6	\$7.4

<sup>a</sup> PQS is the EQS adjusted for each permit holder's use of the 5% overage/underage provision

<sup>b</sup> Number of landings is approximate.



## **FIGURES**

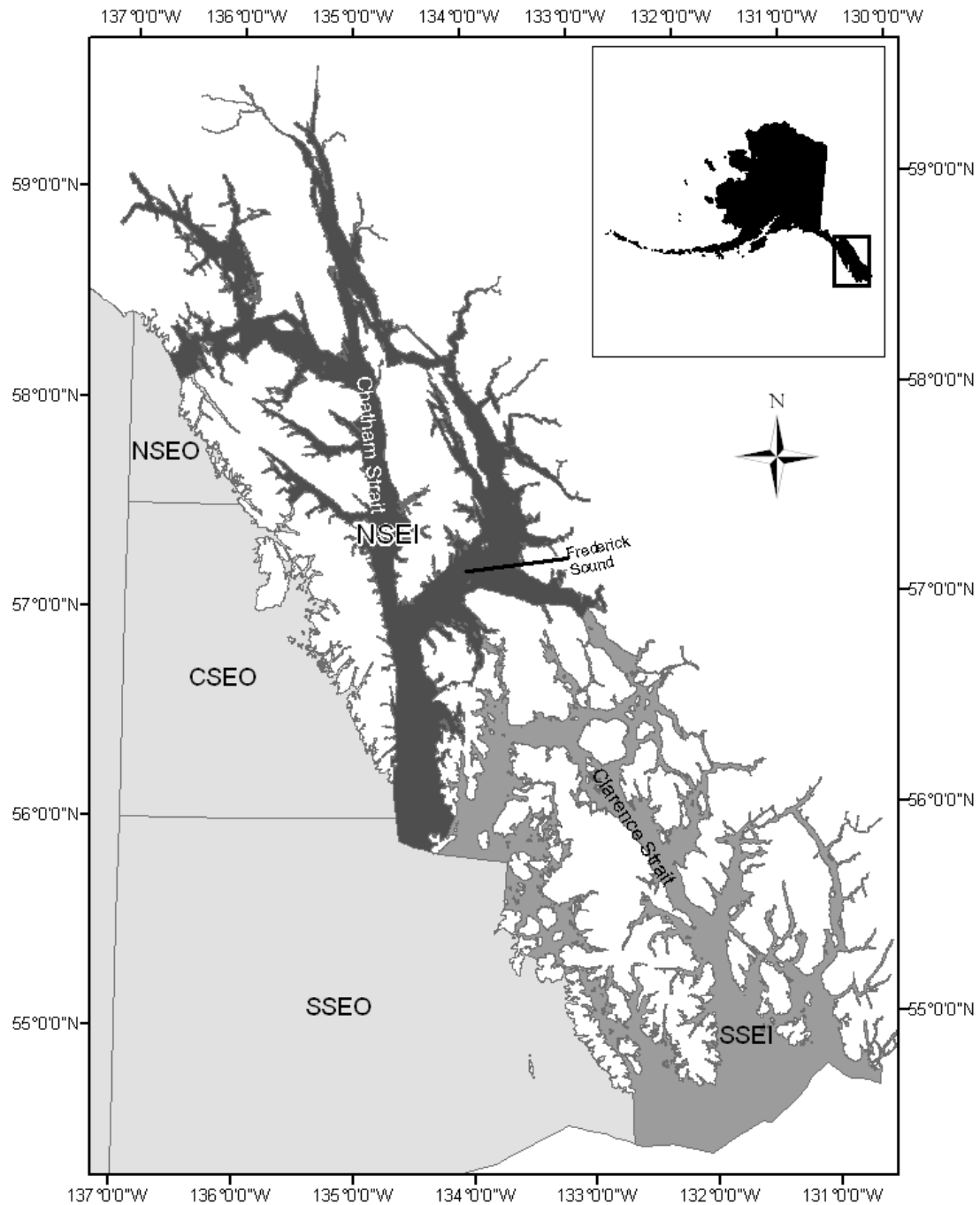


Figure 1.—Management areas for the state sablefish fisheries in Southeast Alaska, including Northern Southeast Outside (NSEO), Northern Southeast Inside (NSEI), Central Southeast Outside (CSEO), Southern Southeast Outside (SSEO), and Southern Southeast Inside (SSEI).

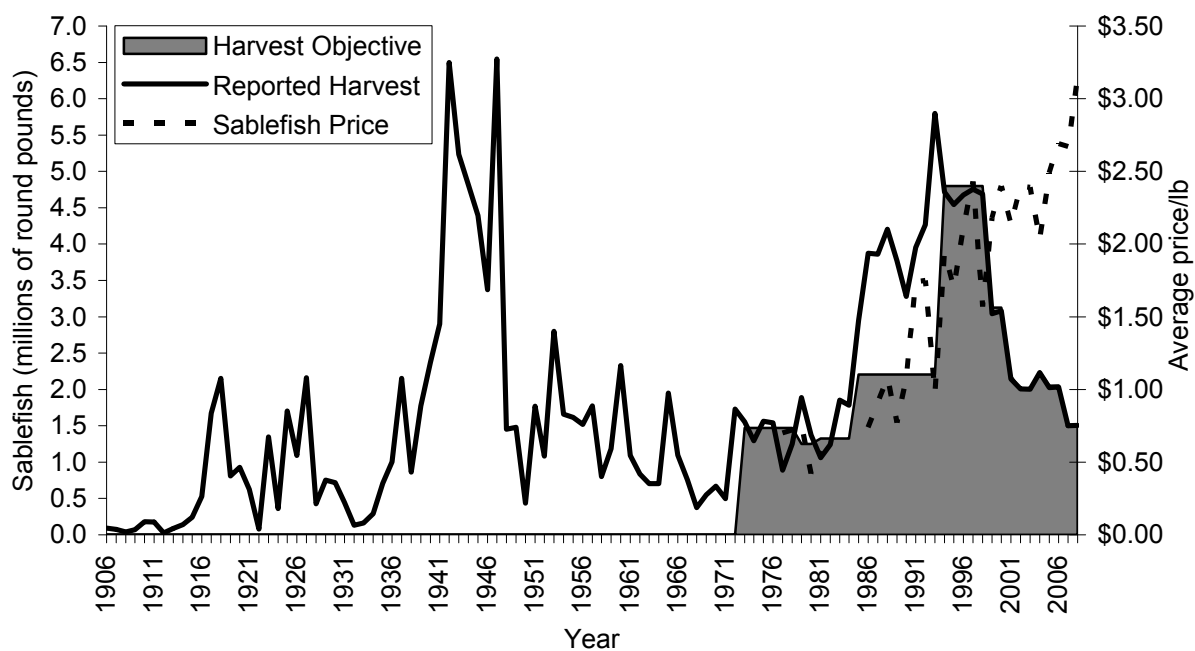


Figure 2.—Northern Southeast Inside (NSEI) sablefish reported catch and annual quota, 1906–2008, and average price per pound, 1977–2008. Records from prior to 1985 are incomplete; harvest levels were approximated using a variety of sources.

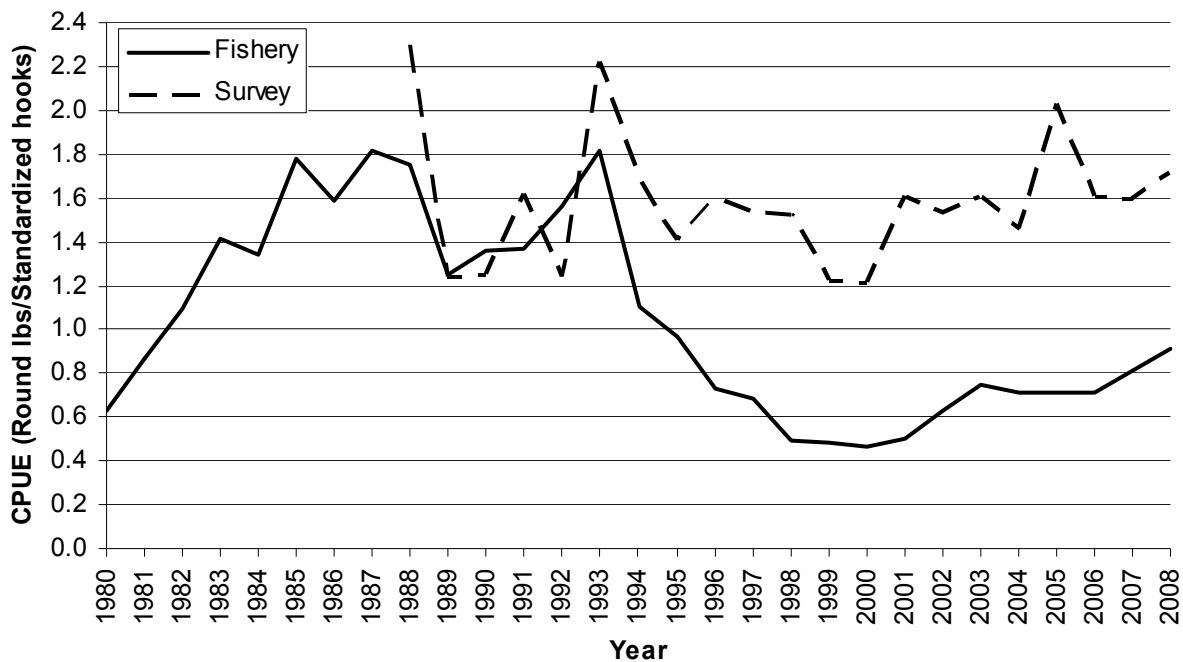


Figure 3.—Northern Southeast Inside (NSEI) commercial sablefish fishery and Alaska Department of Fish and Game (ADF&G) Chatham Strait longline survey CPUE, 1980–2008.

Note: Data used to estimate commercial fishery CPUE from 1997–2008 are from mandatory logbooks and fish tickets. Fish delivery condition (round vs. dressed) is documented on the fish ticket. For years 1997–2000 sets with no record of hook spacing or mixed hook spacing (about 5% of sets) were not included. Verification of some records from 1997–2001 is still underway. Data used to estimate commercial fishery CPUE from 1985–1997 are from voluntary dockside interviews and fish tickets. Fish delivery condition and hook spacing records are incomplete from this period. Landings where fish delivery condition or hook spacing could not be determined were excluded. Conversions were made to standardize j-hooks, which were obsolete by the mid-1980s, to circle hooks, currently used by the fleet. Fish catches caught with j-hooks were multiplied by 1.5 (Appendix E). Catch and effort data from prior to 1985 are estimated from a variety of records, some incomplete. Conversions were made to standardize j-hooks to circle hooks. Longline survey soaks during the 1988–1996 surveys were 1 hour long, as opposed to 3–11 hours long. CPUE data from those years are multiplied by a factor determined by setting side by side gear in 1996.



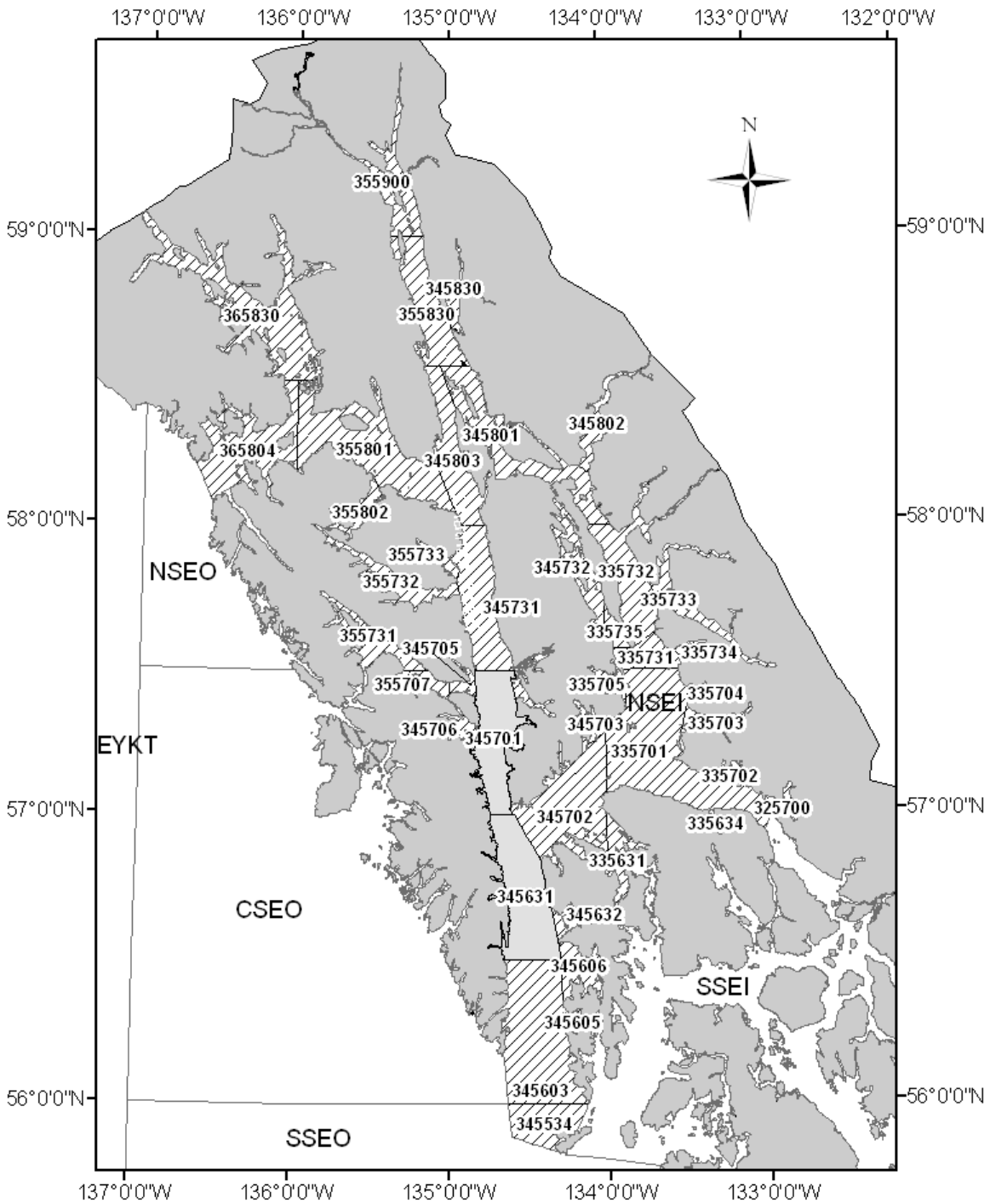


Figure 4.—Alaska Department of Fish and Game groundfish statistical areas in Northern Southeast Inside (NSEI). Statistical areas 345631 and 345701 are shaded.

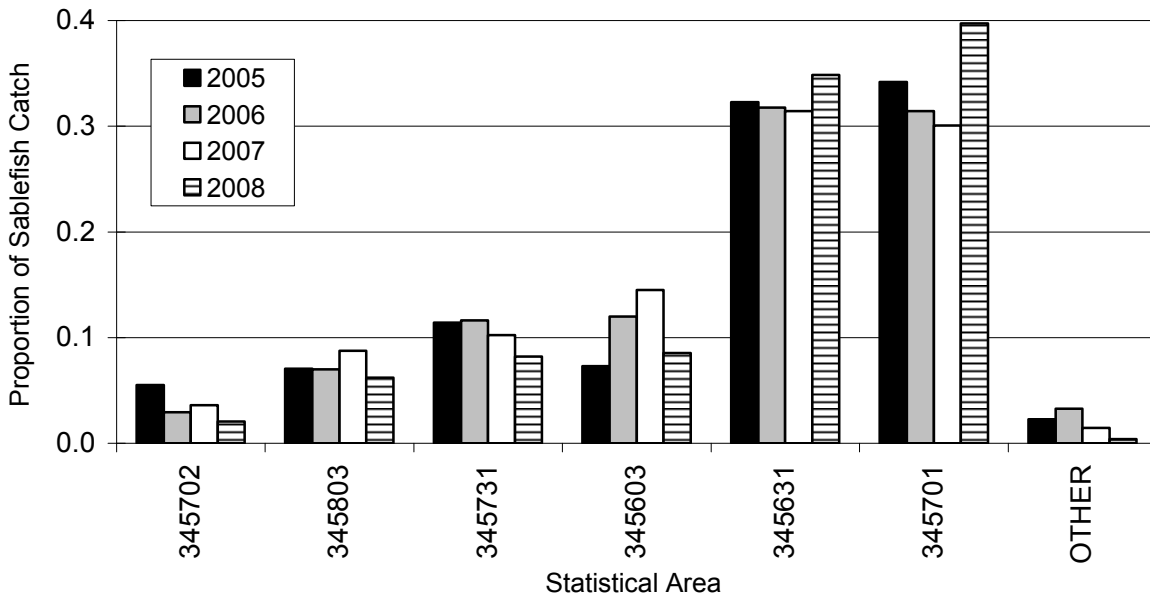


Figure 5.—Northern Southeast Inside (NSEI) sablefish fishery harvest distribution by statistical area and year, from 2005 to 2008. There was no commercial harvest in statistical areas 335731, 335732, 345705, 345706, or 365804 between 2005 and 2008. Harvests under Other denote combined sablefish harvests from statistical areas 335701, 355801, 355830, 345534, and 355707.

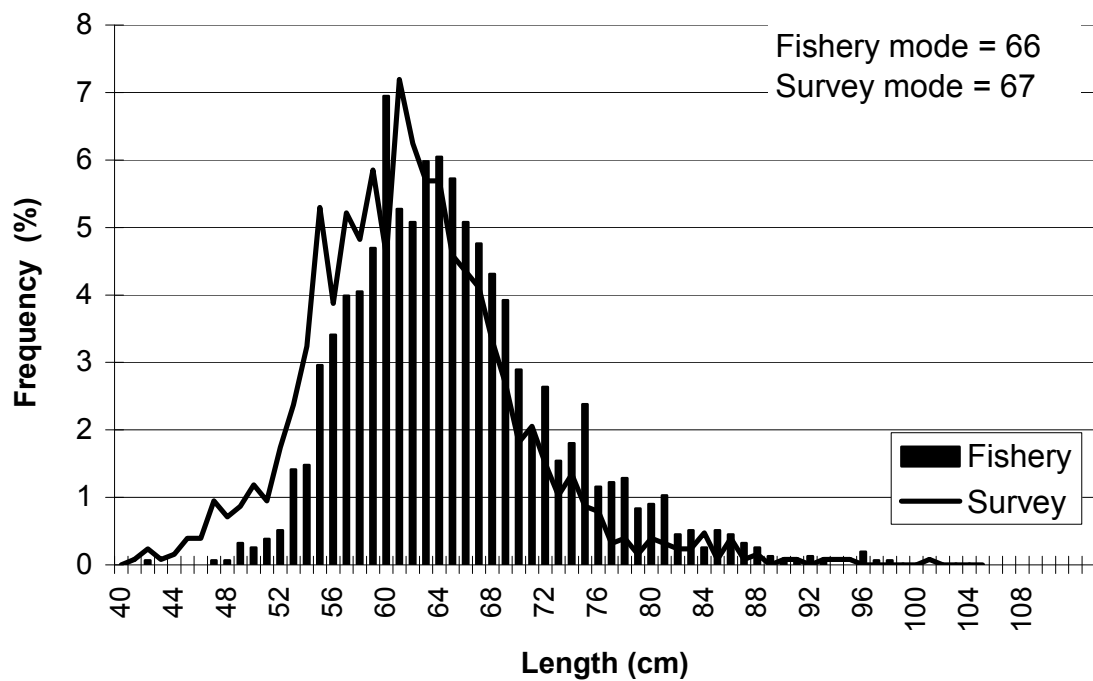


Figure 6.—Northern Southeast Inside (NSEI) sablefish fishery and survey length frequency distribution, 2008.

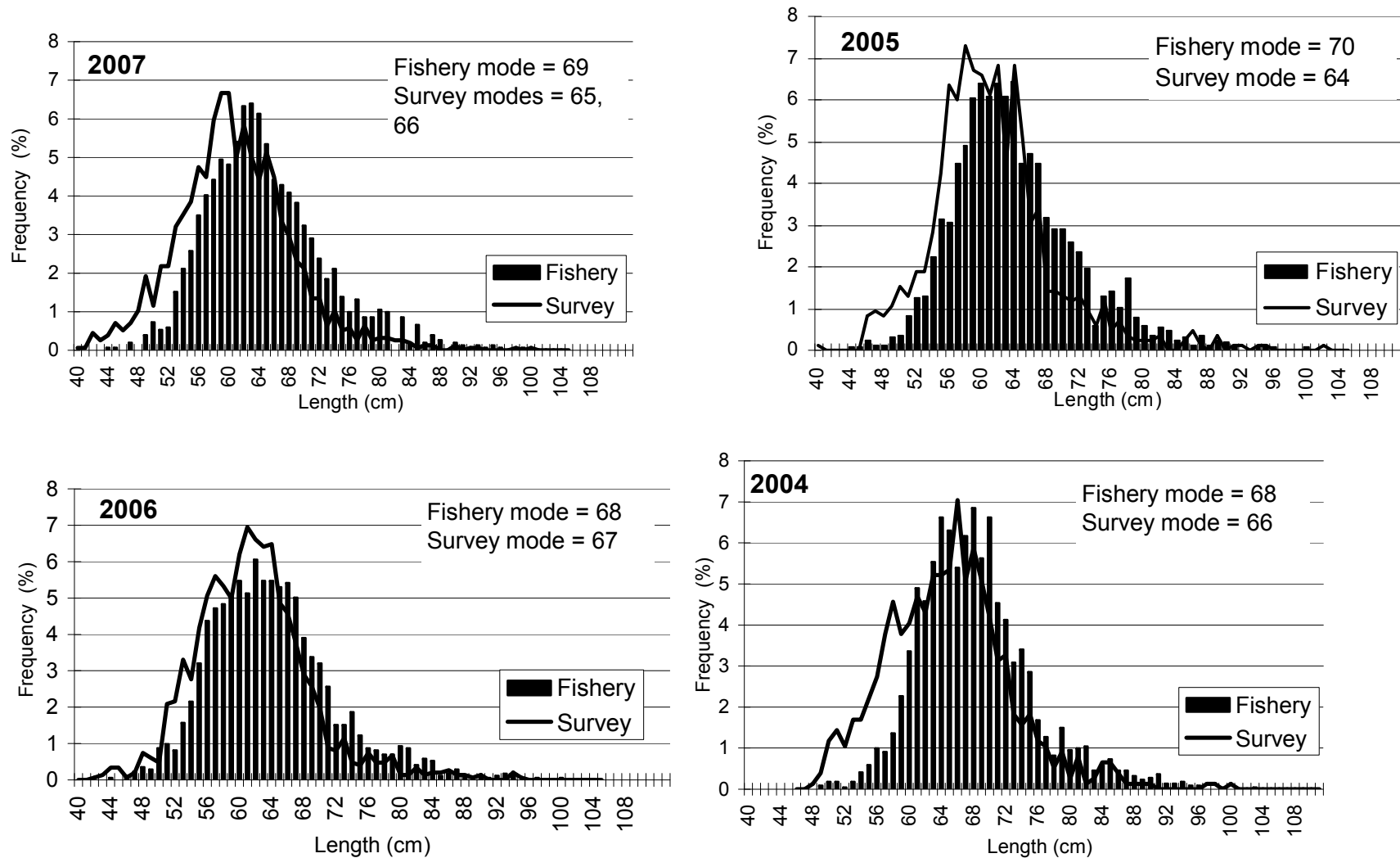


Figure 7.—Northern Southeast Inside (NSEI) sablefish fishery and survey length frequency distributions, 2007–2004.

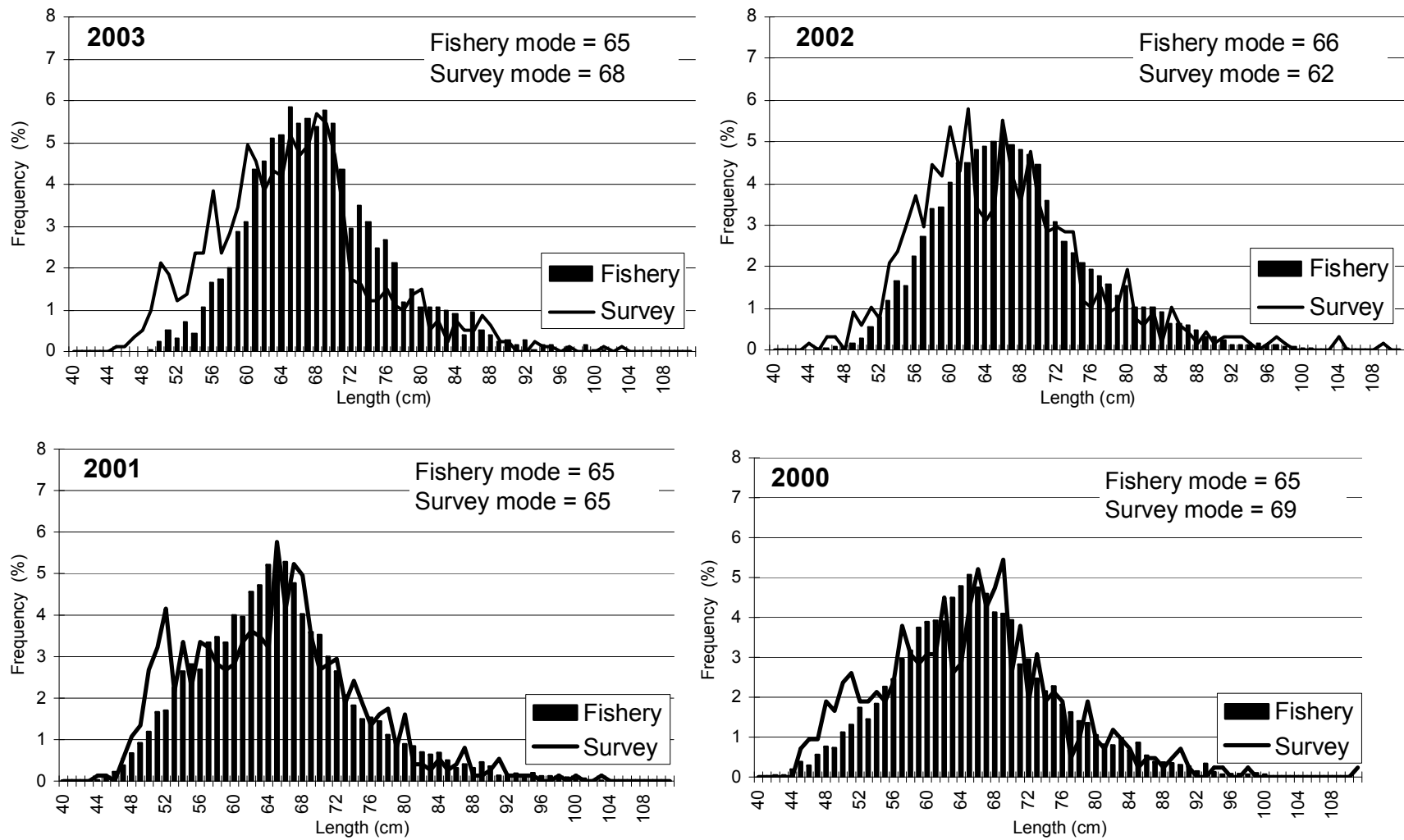


Figure 8.—Northern Southeast Inside (NSEI) sablefish fishery and survey length frequency distributions, 2003–2000.

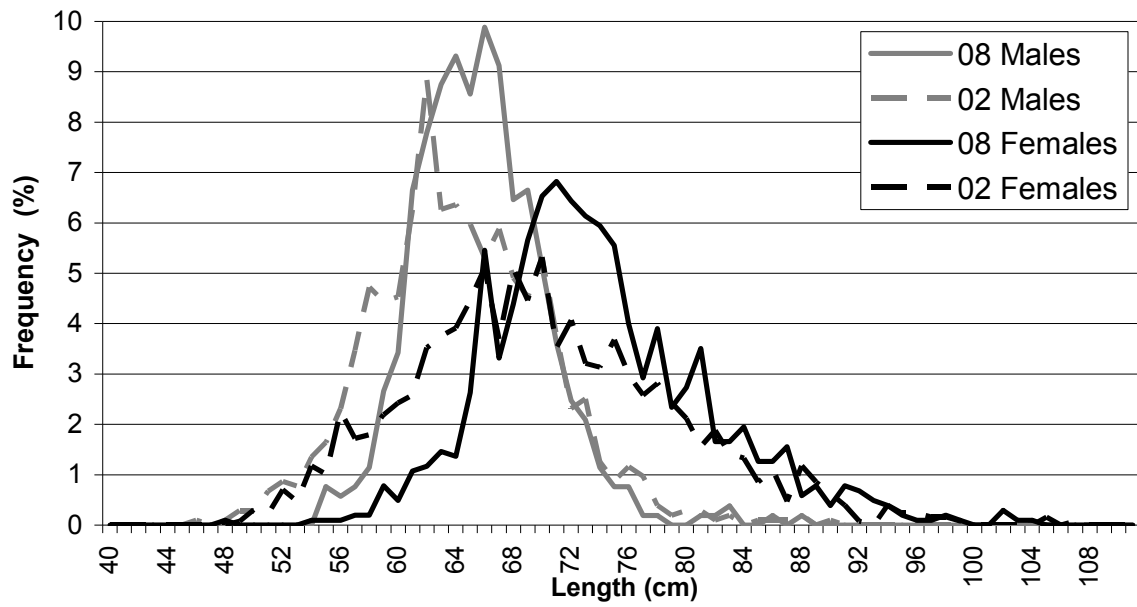


Figure 9.—Northern Southeast Inside (NSEI) sablefish fishery length frequency distributions of male and female sablefish in 2008 and 2002.

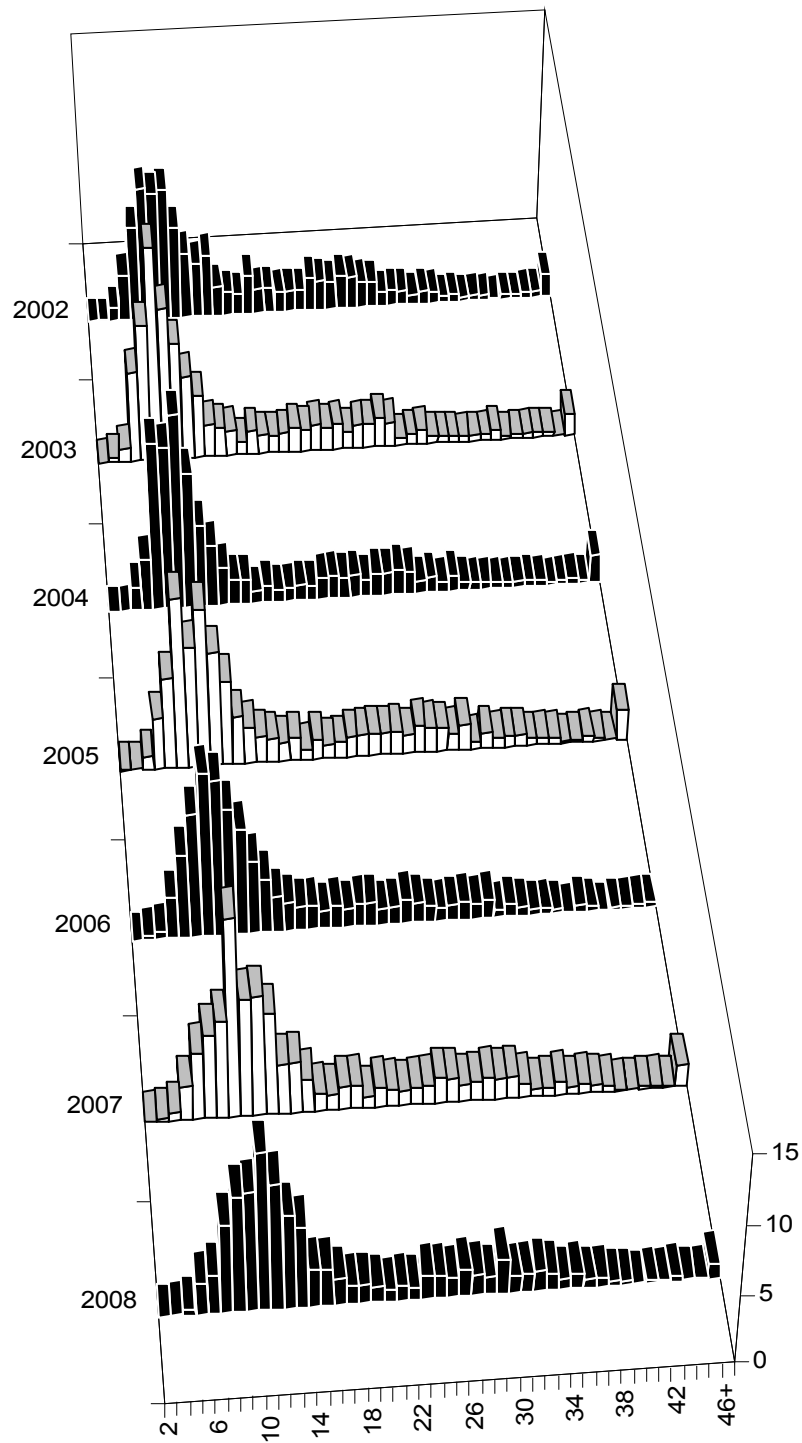


Figure 10.—Northern Southeast Inside (NSEI) sablefish fishery age frequency distributions, 2002 to 2008.

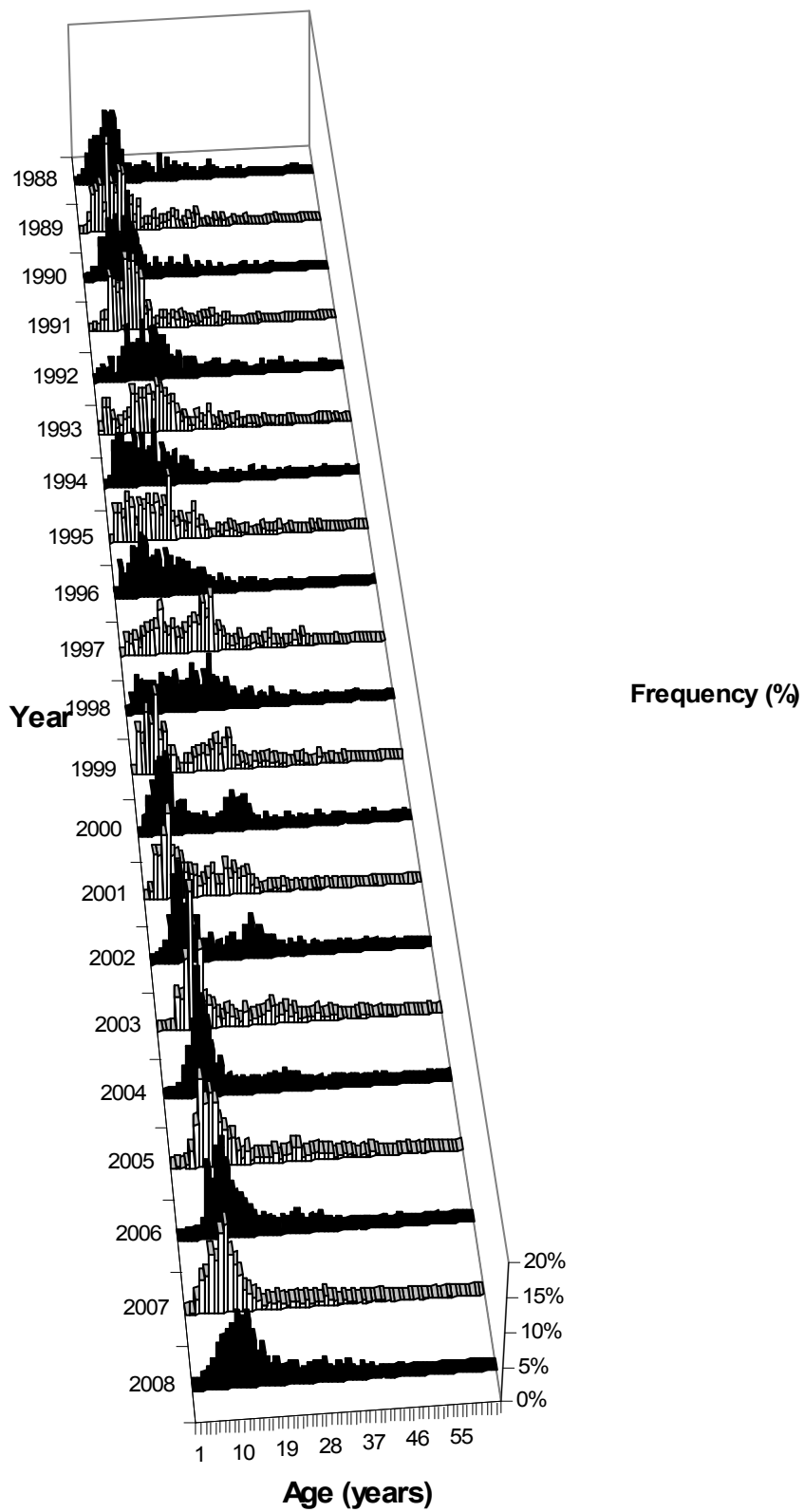


Figure 11.—Northern Southeast Inside (NSEI) sablefish longline survey age frequency distributions, 1988–2008.



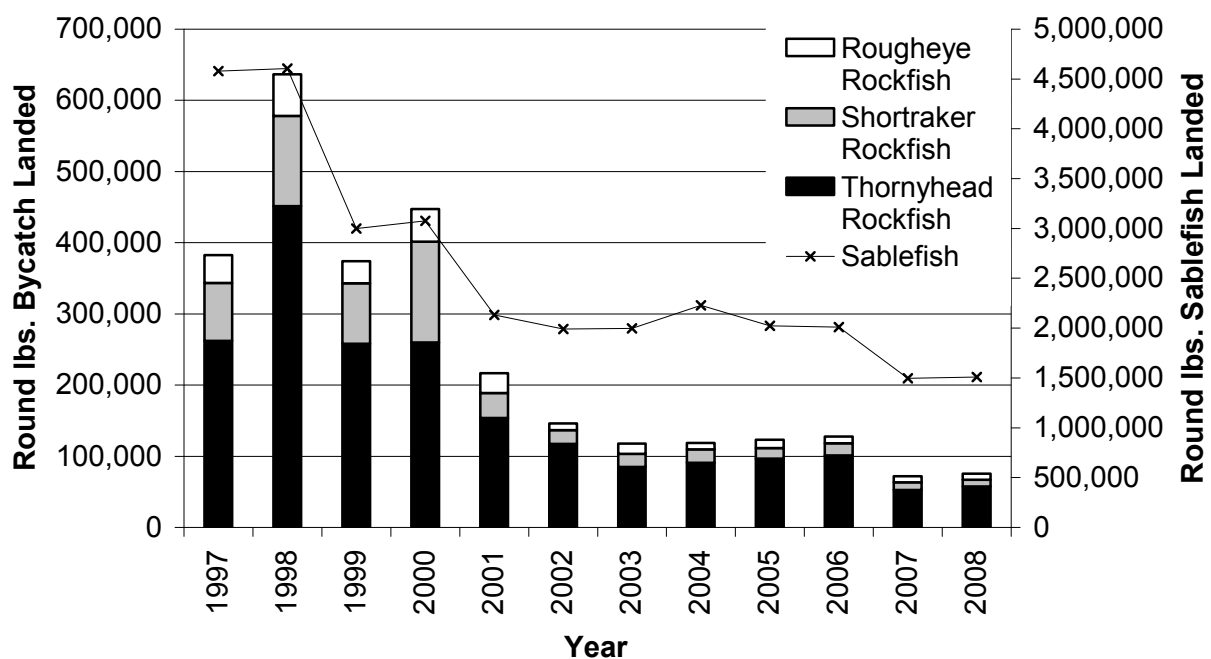


Figure 12.—Northern Southeast Inside (NSEI) round pounds of bycatch, by species, on trips targeting sablefish, 1997–2008.



## **APPENDICES**

Appendix A.—Chronology of NSEI sablefish fishery management action and changes in season and harvest. dr = dressed pounds and rd = round pounds.

Year	Harvest Objective	Dates Fishery		Management Actions
		Open		
1867	no quota	year round		Alaskan Territory purchase began Federal management of AK fisheries.
1871	“	“		US Commission of Fish and Fisheries established.
1903	“	“		US Bureau of Fisheries established.
1906	“	“		An Act for the Preservation and Regulation of the Fisheries of Alaska enacted.
1945	“	3/16–11/30		
1947	“	5/01–11/30		
1959	“	5/01–11/30		Alaska Statehood. Fisheries management transferred to the state. Alaska Board of Fish (BOF) maintained regulations already in place in 1959.
1963	“	8/15–10/15		
1970	“	9/15–11/15		Pot gear first allowed.
1972	“	9/01–11/15		Incidental catch allowance reduced to 20%.
1973	GHR: 1,000,000 dr	EO		Quota requested by industry. Fishery closed by Emergency Order (EO).
1974	“	9/01–11/15		
1976	“	“		Magnuson Fisheries Conservation and Management Act (MFCMA).
1978	“	“		Voluntary agreement by Japanese North Pacific Longline-Gillnet Association to withdraw from the area east of Yakutat Bay.
1979	GHR: 850,000 dr	EO		Sablefish become prohibited species in US fisheries for other species. Southeast Groundfish Project established.
				Quota reduced by department recommendation to account for portion of previous quota that came from outside waters.
				Season closed by EO.
				Closure to foreign fishery enforced by federal regulation.
1980	GHR: 500,000–900,000 dr	9/01–11/15		GHR based on harvest from previous ten years $\pm$ two standard deviations from mean.
				Registration 72 hours prior to fishing instituted for all vessels in NSEI by phone, in person, or by radio.
1981	“	9/01–10/10		Fishery closed by EO.
1982	GHR: 300,000–900,000 dr	9/01–9/15		Fishery restricted to longline only.
				Fishery closed by EO.
1983	“	9/01–9/07, 10/10–10/14		Fishery openings set by EO.
1984	“	1/01–3/03, 9/01–9/05		Groundfish management within the intrusion areas beyond the three-mile territorial limit formally conveyed to the state through an amendment to the MFCMA. (1/01–3/03 open period represents landings in this intrusion area during federal opening).
				Fishery openings set by EO.
1985	GHR: 500–1,500,000 dr	9/04–9/05, 10/04–10/06		Limited entry program adopted. Vessel operators who could demonstrate a landing prior to 12/31/1984 were eligible to apply.
				First year Chatham specific CFEC permits were issued (C61A).
				Registration requirement repealed due to enforcement difficulty.
				Groundfish management areas went from 5 digit salmon statistical areas to current 6 digit codes. Area boundaries remained the same.
				Requirement for NSEI fish to be unloaded prior to fishing another area and vice versa instituted.
				Fishery openings set by EO.
1986	“	9/09–9/11		No gear in water 72 hours prior to and 24 hours after fishery rule.
				Fishery openings set by EO.

–continued–

<b>Year</b>	<b>Harvest Objective</b>	<b>Dates Fishery Open</b>	<b>Management Actions</b>
1987	“	9/15–9/16	Begin 24 hour opening by EO.
1988	GHR: 500– 1,500,000 dr	9/19–9/20	
1989		9/22–9/23	NSEI management area first described in Regulations, previously described as the northern sablefish area. Bait regulations instituted, include sablefish as bait. Up to 2,000 lbs. allowed annually, more with a permit.
1990	“	9/12–9/13	
1991	“	9/16–9/17	Statistical area line between Frederick Sound and Chatham Strait changed.
1992	“	9/17–9/18	
1993	“	9/25–9/26	
1994	GHR: 1,000,000– 3,000,000 dr AHO: 4,761,905 rd	9/22–10/22	First year of three year trial quota-share system. Regulations specify a single 30 day period during the 9/01–11/15 season. GHR increased and capped at 3,000,000 dr. Annual harvest limit to be set within the GHR based on survey information and divided equally among all eligible permit holders. Written registration required at least one week before season opening. Retention of tagged sablefish allowed. Sablefish taken for use as bait must be "mutilated" and reported on ADF&G fish tickets.
1995	“	9/13–10/13	In person written registration required prior to fishing. Applied .63 conversion to dressed wt for vessels landing fish round.
1996	“	9/08–11/8	
1997	GHR: 1,590,000– 4,800,000 rd AHO: 4,800,000 rd	9/01–11/15	Equal quota share system made permanent. Sablefish management based on round rather than dressed weight instituted. Confidential logbooks attached to fish tickets made mandatory. Season set in regulation as the entire period between 9/01 and 11/15.
1999	GHR: 1,590,000– 4,800,000 rd AHO: 3,120,000 rd	“	
2000	“	“	EYAK was deleted from 72–24 hr rule. Full retention of all rockfish (not including thornyheads) in inside waters in effect July 5th. CFEC review of optimum number of permits (re) confirmed 73 as optimum number.
2001	GHR: 1,590,000– 4,800,000 rd AHO: 2,184,000 rd	“	Sablefish harvest objective was decreased 30% with notification of indications showing further cut necessary to 1,700,000 for 2002. Public meetings were held in Petersburg, Sitka and Juneau.
2002	GHR: 1,590,000– 4,800,000 rd AHO: 2,005,000 rd	“	Outside review panel of fishery experts met in February to assess NSEI stock assessment program. Lowered AHO 8% based on a harvest rate applied to a mark-recapture estimate of biomass.
2003	AHO: 2,005,000 rd	8/15–11/15	5% overage/underage carry over from one season to the next permitted, including transfer of overage/underage to another permit holder. Discard of healthy fish permitted. Logbook reporting requirements tightened. Selected permit holders allowed to fish outside the regular season at department request to gather data. Sablefish use as bait prohibited. GHR eliminated for clarification purposes.

–continued–

<b>Year</b>	<b>Harvest Objective</b>	<b>Dates Fishery Open</b>	<b>Management Actions</b>
2004	AHO: 2,245,000 rd	8/15–11/15, offseason trips Jan– Apr	First year of allowable pre-season fishing with Commissioner’s Permit. First year with individual personal quota shares (PQS), Equal Quota Shares (EQS) adjusted for the permit holders’ share of the 5% overage/underage.
2005	AHO: 2,053,000 rd	8/15–11/15, offseason trips Feb– May	
2006	“	8/15–11/15	Overage/underage transfer repealed and the rest of overage/underage policy made permanent.
2007	AHO: 1,488,000 rd	“	
2008	AHO: 1,508,000 rd	“	Meetings with industry held in Sitka, Juneau, and Petersburg to discuss current stock assessment and declines in quota, January.
2009	AHO: 1,071,000 rd	“	

Appendix B.—Information on regulations for the Northern Southeast Inside Subdistrict (Chatham Strait) sablefish fishery adopted by the Board Of Fisheries in Anchorage, Alaska, March 1994.

---

The Department of Fish and Game (department) has received many questions regarding the new regulations for the Northern Southeast Inside (NSEI) Subdistrict (Chatham Strait) sablefish fishery which were passed by the Board of Fisheries (BOF) March 16, in Anchorage. This report provides background material on the fishery and information on what occurred during the BOF meeting.

## BACKGROUND

The NSEI Subdistrict sablefish fishery has been expanding dramatically for over a decade. Rapidly increasing effort resulted in adoption of a limited entry program in 1985. The limited entry program was requested by the industry to halt the increasing number of larger vessels being built for the off-shore fishery from moving into the inside areas. Memos between the department and the Commercial Fisheries Entry Commission (CFEC) document that the limited entry program was never conceived as an end to management problems, but rather as the first step toward developing a comprehensive sablefish management program. Proposals to implement other regulatory measures such as gear or trip limits were rejected by the BOF in 1988 and 1990 because of opposition from the industry.

The fishery has been reduced to a 24-hour annual season since 1987 and, even with the shortened season, the harvest objectives have been consistently exceeded. Most of the increased harvest can be directly attributed to increases in vessel efficiency. In 1984 each vessel set an average of less than 5,000 hooks per boat per day. By 1993 the average had increased to 31,200 hooks per boat per day. The gear and fishing methods have also improved over that time. The 1993 harvest of over 3,600,000 pounds dressed weight was 700,000 pounds above the harvest objective and was the third highest harvest reported in the 87-year history of the fishery. Interview data indicates an additional unreported dead-loss of between 100,000 and 200,000 pounds last season because of lost gear, resulting in an estimated total mortality of nearly 4,000,000 pounds dressed weight during the 1993 fishery.

The reported harvest has exceeded 4,000,000 pounds dressed weight only twice in the history of the fishery, in 1942 and again in 1947. During that period of high harvest levels, the catch per skate dropped dramatically and the sablefish stocks remained at low levels for over 30 years. The historic data suggests that the high harvest taken during the 1993 fishery is not sustainable, at least over the long term.

At the November BOF meetings in Sitka the department proposed increasing the upper end of the guideline harvest range (GHR) from 1,500,000 to 3,000,000 pounds dressed weight. Fisheries performance and department survey data indicates that stock levels increased substantially during the 1980's because of two strong year classes. The population appears to have remained fairly stable since 1989 with annual harvests of between 2,200,000 and 2,800,000 pounds dressed weight. The catch per hook in the 1993 survey, which was conducted just prior to the 1993 fishery, was the highest observed in the area since 1988. This suggests that harvests near 3,000,000 pounds dressed weight are probably sustainable, at least for the short term. However, the staff explained that any impacts on the stock resulting from the near record harvest taken during the 1993 fishery will not be known until after completion of the 1994 pre-season survey. After considerable discussion, the BOF increased the upper end of the GHR to 3,000,000 pounds, but with the stipulation that the department must manage the fishery within the newly adopted range for the 1994, 1995, and 1996 seasons.

---

—continued—

Also during the November meeting, the Alaska Longline Fishermen's Association (ALFA) submitted a proposal to implement gear limits and to hold industry/departments meetings prior to each season to establish specific regulations for the up-coming season. It was envisioned that this process would be similar to the International Pacific Halibut Commission (IPHC) Conference Board, which meets annually to make management recommendations for the halibut fishery. However, the BOF cannot delegate authority to the department to make management decisions outside of the written regulations except for in-season Emergency Order action, and then only for conservation reasons. The BOF did not feel they were given enough information during the November meeting to adopt specific gear limit regulations and the gear limit proposal was deferred to the March, 1994, BOF meeting in Anchorage.

The BOF requested Linda Behnken, Executive Director of ALFA to coordinate a management workshop with the industry prior to the March meeting to explore additional management options. Linda agreed to coordinate a management workshop, but stated that this should not be considered an official ALFA undertaking and that she would not be willing to coordinate future meetings. The BOF also requested Linda to attend the March BOF meeting in Anchorage to report on the results of the industry workshop, including any specific recommendations from the industry.

The management workshop was held February 3 and 4 in Sitka. All NSEI Subdistrict sablefish permit holders, area processors, the department, CFEC, and the Fish and Wildlife Protection (F&WP) Division of the Department of Public Safety were invited to participate by way of a letter from ALFA. Twenty-eight out of a total of 120 NSEI Subdistrict sablefish permit holders attended. Scott Marshall, Barry Bracken, and Tory O'Connell represented the department, Kurt Schelle represented CFEC, and Sgt. Starbard represented F&WP. Representatives from Sitka Sound Seafood, Seafood Producer's Coop., and Kake Cold Storage also attended. Minutes from the meeting, which were taken by Linda Perkins, are on file at department offices in Petersburg and Sitka.

Department staff explained that the only management tools the department currently has, outside of regulations passed by the BOF, are time and area restrictions and that area closures are not considered to be a viable option for this fishery. It was further explained that, if no other management alternatives were found, the 1994 fishery would very likely need to be less than 24 hours in order to remain within the 3,000,000-pound harvest limit implemented by the BOF. When asked how much less fishing time would be allowed, a quick calculation indicated that, based on the recent annual increase in fleet efficiency and assuming a linear time/harvest relationship, the fishery would need to be reduced to 18 hours or less to remain within a 3,000,000-pound dressed weight limit.

Kurt Schelle informed the group that it is not likely that there will be any notable reduction in the number of permits available over the next two seasons as there are several other fisheries ahead of this one still awaiting final permit resolution. The number of permits might be slightly lower by 1996 and should decrease further after 1996 when more hearing officers will be available for this fishery.

Sgt. Starbard stated that F&WP would not support a gear limit proposal because of the complexity of making a case with longline gear and the number of hooks involved. However, the door was left open for the industry to devise gear restriction regulations, which can be enforced. An industry subgroup was formed to further explore longline gear limits as a future management option.

---

—continued—



---

The processors who attended indicated that they are concerned with product quality. Many felt that fish were being retained on board or on the dock too long before processing and that some fish are being poorly handled, thus decreasing product value. Some processors have apparently promised to buy more fish than can be processed within a reasonable time and have vessels lined up for five or six days prior to unloading the fish. There were also reports of round fish deliveries to out-of-state processors. Concerns were expressed that this trend compromised earlier efforts to have Chatham Strait fish recognized by the market for their top quality.

The fishermen then began discussing management options. Many wanted to find ways to make gear limits work. Others wanted to maintain a 24-hour fishery until stocks showed a significant downturn. Department staff explained that was not an option given the BOF directive to manage the fishery within a 3,000,000-pound limit. Some fishermen complained, "If only CFEC would do their job, there would be no problem." Still others preferred to further reduce fishing time as the best solution. Trip or fishing period limits were also discussed at some length. During the remaining half day of discussion, the group compiled a rather broad list of management alternatives, which were subsequently placed on a survey, which was mailed to all NSEI Subdistrict sablefish permit holders for completion.

#### BOARD OF FISHERIES MEETING, ANCHORAGE MARCH 14–16, 1994

On March 14, 1994 at the BOF meeting in Anchorage, Groundfish Biologist, Barry Bracken, presented a status report on the NSEI area sablefish fishery and Linda Behnken presented the results of the industry survey. Neither the BOF members nor the department staff had seen the results of the survey prior to the meeting. Of the 120 NSEI Subdistrict sablefish permit holders, 68, or 57% responded to the survey. Of those who responded 75% favored a pre-season registration, 63% favored a vessel size limit, 85% favored trip or fishing period limits, 62% preferred a 30-day open fishing period over several other options ranging from 24 hours to 2.5 months, and 88% favored a sunset clause which would terminate the trip limit regulation at the end of the 1996 season, prior to the next regular BOF cycle which is scheduled to consider S.E. Alaska groundfish issues. Slightly over 79% favored holding annual or bi-annual staff/industry meetings to discuss management options, however, the survey noted that subsequent meetings would not be facilitated by ALFA. Sixty-five percent of the respondents favored a September 26 opening date to a September 1 opening date if the 1994 season lasts more than 24-hours. Only 17% of the respondents preferred retaining time/area closures as the only "management tool" and 35% favored continuing to consider gear limits as a future management option for this fishery.

Public testimony was held on Tuesday. The one individual who testified on this issue was totally opposed to trip limits, including IFQs for the offshore sablefish and halibut fisheries.

The department was requested to write draft regulations based on the results of the industry survey. The draft regulations were submitted to the BOF on March 16, just prior to discussion on the original gear limit proposal. The BOF accepted the draft regulations as substitute language for the original proposal. With the exception of a proposal to limit vessel size, all regulations, which received majority support on the industry survey, were subsequently adopted by unanimous vote. The department asked for clarification of the directive to limit the harvest to 3,000,000 pounds, which was adopted by the BOF in November. The BOF reaffirmed their mandate to the department to manage the fishery within a 3,000,000 pound dressed weight limit for the next three seasons.

---

–continued–

The following is a summary of the new regulations.

1. An annual harvest limit will be determined for each permit holder by dividing the annual harvest objective for the NSEI Subdistrict by the number of permits eligible to fish at the beginning of each season. If the 1994 survey indicates that stocks have remained at high levels, it is estimated that each permit holder will be allowed to harvest approximately 25,000 pounds dressed weight (39,700 pounds round weight) during the 1994 season. To assess the impact this might have on individual harvests, the distribution of past landings greater than 25,000 pounds was computed. In 1987, 17% of the fleet landed over 25,000 pounds, by 1992, 41% of the fleet landed over 25,000 pounds and by 1993, 60% of the fleet landed over 25,000 pounds. Given this information, the BOF acknowledged that the new regulations would result in significant reallocation of the harvest compared to the recent trend, but recognized that it greatly increases the probability that the fishery can be managed within the GHR. This regulation will be repealed immediately after the 1996 season.
2. The annual permit limit may be taken by an individual permit holder at any time during a 30-day season, which is to be set by Emergency Order to occur between September 1 and November 15. Since the proposed language allocates the annual harvest limit to a permit holder rather than to a vessel, conceivably more than one permit holder can fish on a vessel. On the other hand, a small vessel operator will be able to make multiple landings up to the annual harvest limit. A check-in and check-out procedure may be required to accommodate this provision. Based on discussions during the meeting, the BOF believes that the longer season will reduce gear loss and life/safety risks, and improve product quality.
3. The proposed regulatory language will be merged with existing regulations to set the opening date for the fishery. Using this criteria, the 1994 fishery would begin on September 22, a date that avoids the fall halibut opening and coincides with the beginning of the second set of favorable tides in September. The department has received requests to modify the regulations and to open the fishery on September 1. However, the department does not have the authority to modify regulations outside of the Board process. Also, because this is an allocative issue, the department takes a neutral position and will not advocate a change for 1994. The department recognizes that when the halibut fishery comes under IFQ management in 1995, the current provision, which requires that the sablefish seasons be set to avoid conflicts with area 2-C halibut openings, will no longer be required. In future years the permit holders may be polled to pick the opening date from among a number of choices, which satisfy the intent of the regulations.
4. All permit holders must register for the fishery at least seven days prior to the season opening. This will require a written registration and the registration form must be signed by the permit holder(s) who will be on board a specific vessel during the fishery. The proposed language does not have provisions to allow for any changes to be made during the season in the event of unforeseen emergencies, but such provisions may be written into the final regulation.

Copies of the final regulations will be available after they have been reviewed by department staff and the Department of Law. The Department of Law has already provided an opinion that this management approach is within the authority of the BOF and these new regulations should become effective well before the 1994 season.

---

Appendix C.- ADF&G logbook page used in the NSEI sablefish fishery.

ADF&G LONGLINE - POT FISHERY LOGBOOK

PERMIT HOLDER \_\_\_\_\_ TARGET SPECIES \_\_\_\_\_ CREW SIZE (includes skipper) \_\_\_\_\_  
 VESSEL NAME \_\_\_\_\_ PORT OF LANDING \_\_\_\_\_  
 ADF&G NUMBER \_\_\_\_\_ DATE LEFT PORT \_\_\_\_\_  
 SKIPPER NAME \_\_\_\_\_ DATE OF LANDING \_\_\_\_\_

**SYSTEM USED**  
 CONV ☐ SNAP ☐  
 OTHER (explain) \_\_\_\_\_

LONGLINE GEAR				POT GEAR			BAIT(S) USED		%
HOOK SIZE/TYPE	SKATE LINE SIZE	HOOK SPACING	NUMBER OF HOOKS/SKATE	POT DIMENSIONS (ft)	GROUNDLINE WT. OR DIAMETER	POT SPACING (ft)			

SET NO.	DATE SET	TIME SET	Lat X Lon Beginning	DATE HAULED	TIME HAULED	Lat X Lon End	AVERAGE DEPTH (fm)	NO. SKATES OR POTS SET	LOST GEAR Y/N - (HOW MUCH?)	COMMENTS/TAGS ATTATCH TAGS HERE FOR THIS SET				
CATCH DATA please indicate if catch is in NUMBERS or POUNDS (round) use separate box for each species			TARGET	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT
CATCH DATA please indicate if catch is in NUMBERS or POUNDS (round) use separate box for each species			TARGET	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT
CATCH DATA please indicate if catch is in NUMBERS or POUNDS (round) use separate box for each species			TARGET	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT	SPECIES	AMOUNT

ADDITIONAL COMMENTS / Did you shake gear and/or sablefish due to reaching your limit? \_\_\_\_\_ How much? \_\_\_\_\_

WHITE COPY MUST BE ATTACHED TO THE FISH TICKET AT THE TIME OF DELIVERY

Appendix D.—NSEI longline survey specifications, 1988–2009. In 1995 1- and 3-hr soaks were compared.

Year	Dates	Vessels	Hks/ set	Hk space	Hk size	Gangion length	Bait	Soak (hrs)	Skate Wts (lbs)	No. Set
1988	8/14–8/26	<i>F/V Betty</i>	1000	3 m	13 C	NA	Herring	1	No	24
1989	8/07–8/25	<i>F/V Carrie</i>	500	3 m	13 C	NA	Herring	1	No	44
1990	8/26–9/10	<i>F/V Isis</i>	500	3 m	13 C	NA	Herring	1	No	40
1991	8/13–8/30	<i>R/V Stellar</i>	500	3 m	13 C	0.375 m	Herring	1	5	40
1992	8/17–8/31	<i>F/V Charles T</i>	500	3 m	13 C	0.375 m	Herring	1	5	40
1993	8/23–9/08	<i>R/V Medeia</i>	500	3 m	13 C	0.375 m	Herring	1	5	38
1994	8/23–9/05	<i>R/V Medeia</i>	500	3 m	13 C	0.375 m	Herring	1	5	38
1995	8/23–9/08	<i>R/V Medeia</i>	500	3 m	13 C	0.375 m	Herring	1	5	30
							Squid	3		6
							Squid	3		24
1996	8/17–8/31	<i>R/V Medeia</i>	500	3 m	13 C	0.375 m	Herring	1	5	38
	8/19–8/23	<i>F/V Ida June</i>	750	1 m	13 C	0.2 m	Squid	3–7	½	16
1997	8/07–8/13	<i>F/V Ida June</i>	923–	2 m	13 C	0.2–0.3 m	Squid	3–11	½–7	45
		<i>F/V Charles T</i>	1217							
		<i>F/V Kruzof</i>								
1998	8/13–8/19	<i>F/V Ida June</i>	831–	2 m	13 C	0.2–0.3 m	Squid	3–11	½–7	45
		<i>F/V Charles T</i>	1267							
		<i>F/V Ocean Cape</i>								
1999	8/15–8/23	<i>F/V Ida June</i>	1002–	2 m	13 C	0.2–0.3 m	Squid	3–11	3	45
		<i>F/V Charles T</i>	1129							
2000	8/16–8/23	<i>F/V Ida June</i>	1125	2 m	13 C	0.375 m	Squid	3–11	7	45
		<i>F/V Charles T</i>								
		<i>F/V Spirit</i>								
2001	8/08–8/13	<i>F/V Ida June</i>	1125	2 m	13 C	0.375 m	Squid	3–11	7	45
		<i>F/V Charles T</i>								
		<i>F/V Sylvia</i>								
2002	8/13–8/18	<i>F/V Ida June</i>	1125	2 m	13 C	0.375 m	Squid	3–11	7	44
		<i>F/V Charles T</i>								
		<i>F/V Archangel</i>								
2003	8/03–8/07	<i>F/V Masonic</i>	1125	2 m	13 C	0.375	Squid	3–11	7	44
		<i>F/V Ida June</i>								
		<i>F/V Archangel</i>								
2004	8/05–8/09	<i>F/V Masonic</i>	1125	2 m	13 C	0.375	Squid	3–11	7	44
		<i>F/V Charles T</i>								
		<i>F/V Archangel</i>								
2005	7/27–8/02	<i>F/V Charles T</i>	1125	2 m	13 C	0.375	Squid	3–11	7	44
		<i>F/V Seaview</i>								
		<i>F/V Masonic</i>								
2006	8/01–8/07	<i>F/V Charles T</i>	1125	2 m	13 C	0.375	Squid	3–11	7	44
		<i>F/V Seaview</i>								
		<i>F/V Masonic</i>								
2007	8/04–8/10	<i>F/V Charles T</i>	1125	2 m	13 C	0.375	Squid	3–11	7	44
		<i>F/V Seaview</i>								
		<i>F/V Masonic</i>								
2008	8/06–8/12	<i>F/V Charles T</i>	1125	2 m	13 C	0.375	Squid	3–11	7	44
		<i>F/V Seaview</i>								
		<i>F/V Masonic</i>								
2009	7/28–8/03	<i>F/V Ida June</i>	1125	2 m	13 C	0.375	Squid	3–11	7	44
		<i>F/V Sherrie Marie</i>								
		<i>F/V Seaview</i>								

CPUE is affected by hook spacing and ADF&G adopted the formula used by NMFS for CPUE standardization for commercial sablefish catch data (Sigler 2000):

$$n_s = n_u * 2.2 * (1 - \exp(-0.57 \text{ hook spacing})), \quad (1)$$

Where  $n_s$  is the number of standardized hooks,  $n_u$  is the number of hooks fished and hook spacing is expressed in meters. This formula standardizes the hook spacing to 42". Fishery CPUE is expressed as total round pounds-per-total hooks standardized for hook spacing unless specified otherwise.

Hook type also affects CPUE. Historically j-hooks were considered the standard hook style for this fishery. Circle hooks, which dramatically increased catchability, were first reported in the NSEI sablefish fishery in 1983. CPUEs for j-hook interview data have been adjusted using a factor of 1.5. This rate is the rate NMFS uses as a conversion from the sharp tara hooks from the Japanese longline survey to circle hooks and should be considered a conservative adjustment factor for j-hooks as it is expected that tara hooks are more effective than j-hooks. No adjustments have been made for differences in bait use or hook size.

---

Appendix F.–Sablefish maturity stages and criteria used by the Alaska Department of Fish and Game.

<b>Maturity stage</b>	<b>Description of males at stage</b>	<b>Description of females at stage</b>
Immature	Testes very narrow, parallel, flat and ribbon-like, almost clear in color. Longitudinal creases are easily discernable.	Ovaries appear as two narrow (slender) ovoids. May be veined.  It may be easiest to determine immature from maturing juvenile ovaries while ovaries are intact in fish.
Maturing juvenile	Testes enlarging, not ribbon-like, with four discernable creases running full length. Light pink in color. Has not spawned before.	Ovaries enlarging, translucent and pinkish to clear; eggs not yet discernable. Has not spawned before. Will spawn in the coming year. More veined. Cloudy, but not necessarily throughout.
Mature/developing	Testes large and white, each with four distinct lobes. No milt present.	Ovaries large and becoming white to yellowish white with developing eggs discernable and firmly attached.
Spawning	Testes very large and white, extruding milt freely under slight pressure or when cut.	Ovaries very large with large translucent eggs loose within ovary or extruding from the oviduct.
Spent/post spawning	Testes large, shriveled, often with wrinkles, and bloodshot. No milt present.	Ovaries shriveled and opaque, soft and flaccid, often reddish in color.
Resting	Testes large and firm, light brown to off-white in color. No milt present. Has spawned previously. May have wrinkles.	Ovaries large, firm and opaque, not shriveled. No eggs discernable. Has spawned previously. Noticeable follicle structure.

Appendix G.—Instructions for delivering fish out of state.

---

Delivering fish out of state takes prior planning, well in advance of fishing, as several permits and coordination with several agencies are required. In order to take unprocessed fish out of the state, an individual or company must have an exporter license. There are two different types of exporter licenses, buyer or catcher. The buyer can buy from fishers and export unprocessed fish while the catcher can only export their own catch. The Department of Revenue requires the exporter to be bonded and prepay taxes before they can operate. All processor and exporter applications are together in the “2004 Alaska Seafood Processor and Exporter License and Permit Application: Intent to Operate.” The web link for this application is:

<http://www.cf.adfg.state.ak.us/geninfo/permits/intent/instruct.pdf>

Fishers are required to complete a fish ticket and a physical copy of the fish ticket must be provided to ADF&G before the vessel leaves the state. A completed fish ticket must include the following:

1. Weight of each species with the corresponding condition (delivery) code (i.e., round, bled, headed and gutted etc).
2. An imprint of the valid CFEC gear card.
3. An imprint of a valid Alaskan processor code.
4. A breakdown by percentage of the groundfish statistical areas fished.
5. Signatures of fishers and processor at bottom of fish ticket.
6. A completed logbook documenting the trip must be attached to the ticket.

If fish weights are estimated on the above fish ticket, a completed fish ticket with final weights must be returned to ADF&G within 7 days of landing. If the processor is someone other than the fishers, ADF&G must have a letter authorizing the use of the Alaskan processor code used on the fish ticket before the fish ticket is completed and filed with the department.

---

Appendix H.–Permits and paperwork needed to fish in the NSEI sablefish fishery.

---

1. CFEC limited entry permit card specific to the NSEI sablefish fishery.
2. ADF&G vessel license.
3. Vessel registration filed with ADF&G prior to fishing and kept onboard while fishing.
4. Logbook completed daily, copies kept on board the vessel for the duration of the fishery, including a record of the round weight delivered to date if multiple deliveries are made per season. Logbook pages documenting the landing must be attached to the fish ticket at the time of landing. Use of ADF&G Logbooks is requested. ADF&G logbooks are available at ADF&G offices.
5. Personal Quota Share Tracking Form with individual PQS adjustment for current season, available at ADF&G office.

CFEC permit cards, emergency transfer requests, and ADF&G vessel registrations are administered only by the CFEC and not by ADF&G. Applications for these permits are available at ADF&G area offices or on the web at <http://www.cfec.state.ak.us/> .

Fishermen are strongly advised to obtain current Statewide Commercial Groundfish Fishing Regulations books, available at ADF&G offices, and to refer to the regulations and any current news releases before fishing.

---



Appendix I.—Listing of ADF&G Region I Commercial Fisheries Groundfish Personnel, and addresses for commercial vessel license application processors.

Scott Kelley, Regional Supervisor Debbie Hart, Regional Research Supervisor Jennifer Stahl, Fishery Biologist II Deidra Holum, Fishery Technician IV Martina Kallenberger, Research Analyst II	Douglas Office 802 3 <sup>rd</sup> Street Douglas, AK 99824 (907) 465-4250
Bill Davidson, Regional Management Supervisor Cleo Brylinsky, Groundfish Project Leader Mike Vaughn, Fishery Biologist II Kamala Carroll, Fishery Technician IV Craig Monaco, Fishery Technician II	Sitka 304 Lake Street, Room 103 Sitka, AK 99835 (907) 747-6688
Rebecca Knight, Fishery Technician III Julie Hursey, Fishery Technician II	Petersburg 16 Sing Lee Alley Box 667 Petersburg, AK 99833 (907) 772-3801
For commercial permits and vessel license applications contact:	State of Alaska <b>Commercial Fisheries Entry Commission</b> (907) 789-6150  <b>National Marine Fisheries Service</b> , Alaska Regional Office (907) 586-7229  <b>Restricted Access Management</b> program (RAM), P.O. Box 21668, Juneau, AK 99802-1668, (907)-586-7202